RAILROAD GAZETTE

FRIDAY, SEPTEMBER 21, 1877.

The Kentucky River Bridge.

The engraving on this page represents the northern span complete, with half of the middle span as it appeared before the other half joined it from the opposite side. Unfortunately the photograph, from which the engraving was made, was taken from a point west of or below the bridge, whereas all the others were taken east or above it, so that its position in this engraving appears reversed if compared with the others. An account of the erection of the bridge will be found on the editorial page.

Contributions.

Some Thoughts on the Executive and Financial Management of Railways, and the True Cause of their Anomalies.

(Continued from page 415.)

II.

TO THE EDITOR OF THE RAILROAD GAZETTE:

The writer has in the preceding paper discussed principles only. He now purposes to indicate in a practical way just what changes are necessary, in his opinion, to put railway business on a business-like basis, and bring order out of chaos. He hopes to make clear that it needs literally but little more than to turn over a new leaf. His end may best be reached by taking some hypothetical railway and showing what it does do and what it might do.

The Podunk Valley Railroad Company, then, is a prosperous line of the second grade, running about 10 trains a day over 100 miles of track. The nature of its financial condition may be stated as follows:

Nominal value of property and machinery		$6,000,000
Mortgages on do		3,000,000
Yearly receipts from sales of transportation		1,000,000
Cost of manufacturing do.:		
For materials and supplies	$300,000	
" labor and service	200,000	
	$500,000	
Cost of selling do.:		
For rents, buildings and supplies	$75,000	
" labor and service	75,000	
" miscellaneous	50,000	
	$200,000	
		$700,000
Balance, net receipts from business		$300,000
Interest on mortgages (7 per cent.)		210,000
Balance of profit (3 per cent. on nominal business capital)		$90,000

The line is not of sufficient importance to call first-class talent to the presidency, and this place is accordingly filled by a mere figure-head. The board of directors, individually, are competent and level-headed business men in various occupations. The same men in their collective capacity are well-nigh as incapable as a child in arms of any useful service in the office which their names implies. Realizing some small measure of this incapacity, they have appointed the following officers *on a salary*—as to whose special qualifications they have no capacity whatever for judging—to create, retain and increase the above business, which they have no capacity whatever for carrying on or effectively watching themselves:

Managing officials of the Manufacturing Department:		
Superintendent, salary	$5,000	
Purchasing agent, salary	2,500	
Roadmaster, "	2,000	
Master mechanic "	2,000	
		$11,500
Managing officials of the Commercial Department:		
General freight agent, salary	$3,000	
" passenger agent, salary	3,000	
		6,000
Total salaries of the responsible managing officials if the business be conducted with { efficiency / inefficiency } moderate		$17,500

We have already indicated our views on this system, and need say no more about it. Till the day of judgment dawns, the Podunk Valley Railroad Company will never get high efficiency and vigilance for any such money, nor for any fixed sum whatever.

Now let us suppose that this board should, some time during the year of our Lord 1878, be simultaneously struck by lightning; and beholding, as in a vision, the folly of this proceeding should turn to their employes and say: "Gentlemen, we have no complaints to make against any of you, but we fear that we may be damned with faint service. We find that our various grades of transportation have been costing us thus and so, and we propose to separate our business into departments and make stringent contracts with you—or other parties—for a term of years, holding you responsible for all deficiencies and giving you an interest in further excellence." If the directors of the Podunk Valley Railroad could make better terms with responsible outside parties, it would be their interest to do so. But whether they could or could not, they would, if they were wise, in the writer's opinion, find *some* way to make an agreement with the managers of their transportation department on something like the following terms, the form of the agreement being necessarily a mere outline:

ABSTRACT OF FORM OF AGREEMENT BETWEEN THE PODUNK VALLEY RAILROAD COMPANY AND A, B AND C, AS MANAGERS OR CONTRACTORS FOR THE TRANSPORTATION DEPARTMENT OF SAID RAILROAD,

The agreement to be in the nature of a partnership between the said A, B and C and the railroad company to the following effect:

1. That the said A, B and C undertake to conduct the transportation department proper of said railway, including the maintenance and renewal of the perishable plant, without other compensation than — per cent. (⅓ to ⅔) of the reduction effected in the cost of transportation below the schedule of rates hereinbelow given.

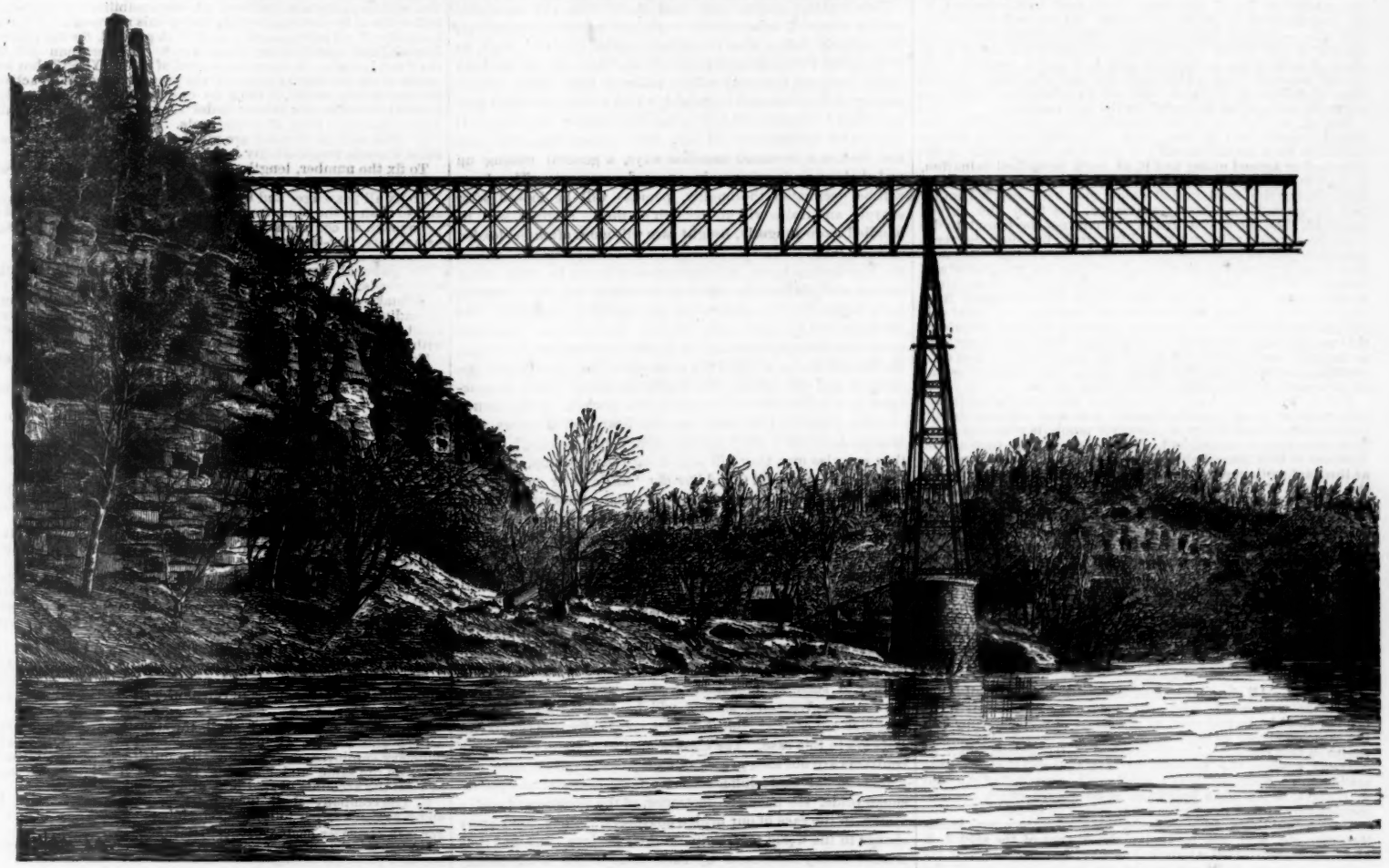
That the said Podunk Valley Railroad Company grants to said A, B and C unrestricted authority for said purpose (except as hereinbelow provided), and agree to turn over to them the entire plant and equipment used for transportation purposes proper and to pay all bills and pay-rolls of said A, B and C monthly, without scrutiny, responsibility or authority as to their amount, except so far as may be necessary to determine that they are genuine and in good faith, for property or labor actually rendered in the service of said company. By virtue of the position of said company as moneyed partner and owner of the property, it shall be entitled to an interest of — per cent. (⅓ to ⅔) in the profits accruing under this agreement, and shall deduct the same from all settlements; but, further than is herein expressly provided for, it shall have no manner of authority or control over the management of said A, B and C.

2. There being no open market by which the value of the transportation furnished can be fixed from time to time, the following schedule of prices is agreed upon as the basis of settlement under this agreement:

For each passenger engine, at not less than 30 miles per hour between D and E	—— cts. per mile.
For each passenger baggage car, do., do., do	—— cts. " "
" " sleeping or parlor car, " " "	—— cts. " "
" " passenger engine between D and F, at not less than 20 miles per hour	—— cts. " "
For each passenger or baggage car, do., do., do., etc., etc., etc.	—— cts. " "
For trains containing —— passenger or baggage cars or more, and for none others, the motive power shall be rated at two engines, whatever may be the number actually in use.	

Each intermediate stopping place of passenger trains shall be rated at one mile.

For each ton of through freight, east, at not less than 15 miles per hour	—— cts. per mile.
For each ton of through freight, west, at not less than 15 miles per hour	—— cts. " "
For each ton of way freight, east, between D and F, at not less than 15 miles per hour	—— cts. " "
For each ton of way freight, west, between D and F, at not less than 15 miles per hour	—— cts. " "
For each ton of way freight, east or west, between all other stations, etc., etc.	—— cts. " "
For each ton of coal, between D and G	—— cts. " "
" " " " " " all other stations	—— cts. " "
" live stock, per head, etc., etc., etc., *ad lib.*	—— cts. " "



ERECTION OF THE KENTUCKY RIVER BRIDGE:

Northern and half of middle span.

3. This schedule is understood to be based on the average prices paid, during the past —— years, for certain labor and supplies in largest demand, as per the following list..... If, at the end of each period of —— years it shall appear that the average price for such items has been increased or diminished by any given percentage during that period, due regard being paid to the relative quantities of each consumed, then the above schedule of rates shall be uniformly increased or diminished by two-thirds of such percentage, but without further change in the conditions of this contract.

4. Settlements shall be made monthly, as follows:

The gross amount due for transportation furnished, as per above schedule of rates, shall be determined from the freight received reports, and passenger car mileage statistics for the previous month. Out of this amount the railroad company shall

1st. Pay all rolls as turned in.

2d. Pay all bills as per schedule rendered.

3d. Deduct drawbacks for delays in transportation, as hereinbelow provided.

4th. Deduct all losses from accidents and damages to persons or property, as herein below provided, together with all legal or other expenses connected therewith.

5th. From the resulting balance of profit deduct (50) per cent. as its own share.

6th. From the remainder of the balance of profit deduct 10 per cent. as a guarantee fund until the same shall amount to —— thousand dollars.

7th. Pay over the residue monthly in cash to the said A, B and C.

In case there shall be no balance of profit in any month then — per cent. of the deficit shall be borne by the railroad company and — per cent. shall be deducted from the guarantee funds of the said A, B and C in the hands of said company; or, if said fund shall be insufficient, then the balance shall be receivable on the bonds of said A, B and C, at the discretion of the company.

5. This agreement shall continue in force for —— successive periods of —— years each, provided that it shall be ter-

minable by said railroad company at any time without notice when it shall appear that for a period of —— months last preceding the cost of transportation has exceeded the above schedule of prices, unless the excess be due to temporary causes for which the consent of said railroad company has previously been asked for and obtained.

SPECIFICATIONS.

Track.—The said A, B and C shall maintain the track to such standard as they may deem advisable, at their sole discretion, subject to the following conditions:

Before entering on this agreement the age, quality, expectation of life and condition generally of the rails, ties, ballast, ditches, etc., shall be estimated as nearly as may be, in any just manner, in order to determine the amount by which the value of the track is deteriorated below first-class condition. At the end of each period of —— years a similar inventory shall be taken and the difference in valuation credited to or charged against the accounts of said A, B and C. In this inventory all expenditures in the nature of additions to the capital account, as for extensions of track or substitution of improved material, shall be assumed, *prima facie*, to be of value equal to the actual cost of such improvement or conditions.

All expenditures in the nature of additions to the capital account shall be paid for in full by the said company when incurred, if made with their approval; but if not so approved, they shall be charged for the time being against the said A, B and C. The Company, however, shall have no veto on such expenses, and, if made without their approval, they shall be charged in with the accounts of said A, B and C for the time being only, but included in the valuations of betterments at each periodical settlement; *Provided* that such expenditures have been made at least one year previous to the date of such settlement.

Rolling Stock.—The said A, B and C shall maintain all rolling stock to such standard and in such quantity as they may deem advisable, at their sole discretion, subject to the following conditions:

First. Before entering on this contract the present worth and expectation of life of all rolling stock shall be determined, in any just manner, as nearly as may be. At the end of each period of —— years, a similar inventory shall be taken and the full amount of any increase or decrease in condition credited to or charged against the accounts of said A, B and C, together with the full amount of any additions to the capital account by additions of rolling stock which may not have been previously assented to and settled for in full by the said company.

Second. In addition to the valuation above provided for, the average useful duty of each kind of rolling stock by various standards for a certain number of years preceding shall be determined or agreed upon; and if, at each periodical valuation, it shall fully appear from the records that the average useful duty, during the total period which may have expired under this agreement, has been greater or less than the agreed standard, then the said A, B and C shall not be bound to deliver the original valuation of rolling stock, but shall deliver a valuation greater or less in proportion as the average duty may have been increased or diminished, it being the true intent and meaning of this condition that that amount of rolling stock shall be considered of equal value which it shall appear from the records is and has been capable of rendering an equal service, independent of the cost or quantity thereof, *Provided*, that no passenger business delayed more than one hour, and no freight business delayed more than one day, in excess of a certain usual percentage as agreed upon, shall be credited at all as a portion of the duty of said rolling stock.

Third. The value of all rolling stock which it shall satisfactorily appear is of equally durable, safe and efficient design shall be considered the same, however much its cost may have been increased or diminished. The value of any increase or decrease in this respect shall be estimated as nearly as may be at the final settlement under this agreement, and treated as in the nature of an addition to or subtraction from the capital account.

Fourth.—The ornamentation and appointments of passenger coaches—being in the nature of an advertisement—shall be at the discretion and cost of the commercial department of said railroad; but shall be executed by said A, B and C, as may be required from time to time.

Fixed Machinery.—At the final settlement under this agreement the said A, B and C shall be expected to turn over the same valuation of fixed machinery as was turned over to them, reasonable charges for depreciation and wear being deducted. Any increase or decrease in the valuation shall be treated as in the nature of an addition to, or subtraction from, the capital account.

Buildings.—All shop buildings, engine houses, and all other structures connected with the transportation department proper, shall be turned over at the close of this agreement in the same condition as received. Proper deductions for deficiencies in this respect, and for gradual deterioration, shall be charged against the accounts of said A, B and C at the final settlement. *Provided*, that it shall not be required of the said A, B and C to maintain buildings or structures which it shall conclusively appear are no longer required or in use.

Station-buildings, freight-sheds, platforms, terminal facilities, etc., etc., will not be under the charge of the said A, B and C, nor maintained at their expense; but they shall, if required, make any necessary repairs on such structures at the expense of the proper department, when the same can be done without interference with the efficiency of their own department.

Sales of Old Material.—An inventory shall be taken of all scraps and other unrequired property before entering on this agreement, and at the close of each period of —— years; and if the aggregate valuation shall be greater or less than in the beginning, the excess or deficiency shall be credited to or charged against the accounts of said A, B and C. Sales of old material, together with all useless or surplus machinery, rolling-stock or other property, may take place at any time at the discretion of said A, B and C, provided that such sales shall be by public advertisement and to the highest bidder. The amount realized from such sales shall be credited in full to the accounts of said A, B and C.

Movement of Traffic.—All freight shall be loaded and unloaded by the commercial department as promptly as may be, under reasonable regulations. The said A, B and C, may require the dismissal of any station employes unreasonably negligent in this respect, after proper notice. All yard expenses connected with the handling of cars and making up of trains shall be at the cost of said A, B and C, and they shall be bound to give reasonable time and facilities for loading and unloading under the penalties for delaying freight provided for below.

The number, speed and time-table for freight trains shall be entirely at the discretion of the said A, B and C; but they shall be bound to deliver all freight within the specified time under a penalty of one-fourth of the mileage dues on said freight for each day's delay, or fraction thereof, over one-half, until the same shall amount to the full amount of such dues.

The time of departure and arrival and number of stops for all passenger trains shall be fixed by the commercial department from time to time; but the said A, B and C may require one week's notice of any general change. The handling of passenger trains shall otherwise be at their own discretion. The number of cars in each train may be changed by the commercial department at any time (or within not less than one hour) before departure.

A penalty of one-tenth of the mileage of any passenger train shall be exacted for each hour's delay or fraction thereof exceeding 15 minutes in the transportation department, until the same shall amount to the full mileage of said train.

Wages.—All rates of wages shall be solely at the discretion of the said A, B and C, and all employes in their department shall be appointed and removable by them. Train employes acting in a fiduciary capacity for the company shall also be removable by the company and their wages pro-rated. All passenger train employes shall also be removable by notice from the Commercial Department, twice repeated.

Accidents.—All loss and damage to freight and passengers while *in transitu*, together with all legal or other expenses connected therewith, and all damages to the company's property or to the property and persons of individuals or other corporations shall be made good out of the profits arising under this agreement, unless the said A, B and C shall be able to furnish conclusive evidence that the accident is due to the neglect or inefficiency of the Commercial Department.

In general, it is mutually understood and agreed upon as the true intent and meaning of this agreement, that the equipment, plant and transportation service shall be maintained or brought into as high a condition of efficiency and excellence as may be justified by the character and volume of its traffic, and at least equal to its present condition; and that the line shall be turned over in such condition on the termination of this agreement; and the said A, B and C expressly agree to and bind themselves to fulfill this condition in good faith. And the said Podunk Valley Railroad Company for its part agrees that such portions of its interested capital and customary annual expenditure for a given service as shall become no longer necessary through the exertions of said A, B and C shall be regarded as the profits accruing under this agreement and divided as herein provided for under the stipulations and conditions hereinbefore given.

[Bonds, stipulations, amplifications and restrictions at discretion. Also prudential modifications as to allowances on any released capital. The abstract has been drawn with a view to showing what is just and expedient in a contract honorably fulfilled on both sides.]

This contract having been once made with any reputable parties who will undertake the work, under proper guarantees, for *any* price below what it has been costing by days' work, as it were, the President and Board of Directors of the Podunk Valley Railroad Company will be relieved from their embarrassing duty of nominal oversight, which serves no other purpose than to disgust and dishearten their higher employes. If they watch the operation of their new system they will soon find that, in a thousand nameless ways, a general waking up and shaking up is going on in every department. The force will be decimated thoroughly, pennies will be looked after sharply, and trains will go through on time. Engines will be handled more gingerly, freight cars will more often be loaded and less often be idle or "stray." That superfluous luxury, the Purchasing Agent, will find a post of honor in some other station, and his place be taken by periodical bids for supplies, to be furnished when ordered as per samples rendered. The employes will be a new body of men. Every one of them will know that there is no mercy for inefficiency *anywhere*, while, at the same time, he will feel the presence of that conciliatory demeanor, and strict, impartial, kindly discipline which is generated by a tender interest for one's own pocket. In the course of a few years it will dawn on the board of directors that Messrs. A, B and C are "making money like smoke;" but, if they are wise men they will bear it with equanimity, knowing that Messrs. A, B and C had *literally* "made their money" by using less value to accomplish given ends. After such a system had been in general use for ten or fifteen years, the Podunk Valley directors would hardly know their line for the same road. A way would be found to combine luxury with lightness, and freight cars would no longer be a variegated assortment of plantation hoes.

Now as the Podunk Valley Railroad Company has all to gain and nothing to lose by such a step, why should it not take it? It may be said that such an agreement opens the door for collusion and fraud; but is the door shut now? The sufficient answer to such an objection is, that experience has shown that such agreements as this *will* be fulfilled honorably by nine men out of ten. But there are especially safeguards for railways in this case. The class of men who would secure such contracts are not men greedy of money for money's sake, and would be far more influenced by their personal and professional pride. We have an illustration of the workings of such a system in the case of our bridge engineers. They have every chance in the world to scrimp on their bridges, but that they are not *unduly* influenced by such temptations is sufficiently shown by the fact that their bridges *do not break down*. What they have learned to do is to draw the line very closely and successfully between the useful and useless. So far in fact from the contract system being disadvantageous, we owe to it more than any other one cause, the remarkable advance of the bridge-building art in America. Under the stimulus of that system men *learn from each other*, as a matter of business necessity and their progress is as the sum of their united abilities. Hired men never learn anything that does not suit their own crotchets. A new era in railway progress will date from the adoption of such a system for the management of transportation.

Then, too, it may be said that Messrs. A, B and C would be under temptation to "starve the road" by all sorts of hocuspocus for the sake of realizing the immediate profit and a percentage on the released capital. Partly we have answered this above; but, moreover, as they are under heavy penalties for delays of traffic (which, however, should be compensatory only, and not punitory; fairly representing the actual or contingent loss therefrom and no more), and if, in spite of these penalties, they deem it for their interest to risk incurring them, then certainly it is for the interest of all parties. They may *err in judgment*, but that is a liability of all human enterprises. After such a system was once inangurated, the sharp competition for such opportunities would be the railroad company's best guarantee for the utmost efficiency.

It is hard to see what further objection can be made to such a system except that it seemingly introduces an additional complication, and would probably be attended with more or less friction. Doubtless it might be—or might not—but so are construction and many other contracts more complicated *in theory* and attended with a great deal of friction. But men have learned that in *such* cases the advantages far outweigh the disadvantages, and they will most assuredly do so, at no distant day, in the parallel but far stronger case of the operation of railways.

We will suppose, therefore, that the Podunk Valley Railroad Company, having arranged for the management of its transportation department, and found—as it surely would—that the system worked greatly to its advantage, determined to follow the same system in the management of the other great department of its business. The writer pretends to but little familiarity with the details of that department, but we may expect that the final agreement would be in something like the following form:

ABSTRACT OF FORM OF AGREEMENT BETWEEN THE PODUNK VALLEY RAILROAD COMPANY, AND X, Y AND Z, AS MANAGERS OF THE COMMERCIAL DEPARTMENT OF SAID RAILROAD.

1. The agreement to be in the nature of a partnership between the said X, Y and Z, and the said railroad company to the following effect:

The said X, Y and Z assume the entire responsibility for the management of the Commercial Department proper of said railroad, including the maintenance and renewal of all station buildings, freight sheds, etc., etc., as herein below specified, and all running expenses of said department, without other compensation than — per cent. of the net profit realized from transportation over the schedule of prices herein below specified.

The said railroad company shall turn over to said X, Y and Z its entire real estate and chattel property required for the conduct of the commercial department proper, and shall pay all bills and pay-rolls of said X, Y and Z without scrutiny, responsibility or authority of any kind, except so far as may be necessary to determine that they are genuine and in good faith, for labor or property actually furnished in its service. The said company also assumes all responsibility for the safe collection of the revenue arising under this agreement; for the integrity of all minor employes, and, in general, for the entire financial and book-keeping department. Further than this it shall not interfere in the management of said X, Y and Z, but by virtue of its position as owner of the property, and, as an active partner to this extent, it shall be entitled to a three-fourths interest in the profits arising under this agreement, and shall deduct the same from all settlements.

2. The said X, Y and Z are given the sole authority and assume the sole responsibility for the following duties:

To fix the number, length, number of stoppages and time of departure and arrival for all passenger trains;

To fix all passenger and freight rates, both through and way, and to change the same from time to time, at their discretion;

To make all contracts for transportation of mails, express, palace cars, fast-freight lines, etc., etc.;

To issue all passes;

To make all arrangements for exchange of business with other roads;

To make all regulations and arrangements for the loading, unloading and storage of freight and baggage, subject, in respect to freight, to the conditions of the company's contract with the Transportation Department;

To fix the rate of pay of all station agents, station employes and baggagemen, and to appoint and remove the same;

To fix the rate of pay of passenger conductors and to remove the same;

To fix the number and rent of all branch offices and the number, salary and powers of all employes thereat;

To maintain and renew all station buildings and other real and personal property not in charge of the Transportation Department;

To fix, maintain and arrange generally, for all terminal facilities of every class, including ferries, expresses, transfer coaches, cattle-yards, elevators, etc., etc., etc;

To fix the cost and style of ornamentation and interior fittings for all passenger cars and bear the expense of maintaining or improving the same;

To assume all expenses and arrangements for foreign agencies, stationery, advertising, damages to freight and passengers at stations or in storage, and in general all soliciting or incidental expenses connected with the Commercial Department proper;

To fix the form and number of all coupon or other tickets of every form, ordering the same through the proper officer of the company at their own cost and notifying the proper officer of the company of all changes in rates, who shall in turn notify all ticket agents.

The company, on its part, shall, through the proper officers, collect and receive all moneys, and audit the accounts of all fiduciary employes, maintaining all requisite checks and oversight on the same and charging the cost of all such service against the accounts of said X, Y and Z.

3. The company shall furnish transportation to said X, Y and Z at rates as per following schedule:

For each passenger engine between D and E, at not less than 30 miles per hour.....	—— cts. per mile
For each passenger or baggage car, at not less than 30 miles per hour.....	—— cts. " "
For each passenger engine between D and F, at not less than 20 miles per hour.....	—— cts. " "
For each passenger or baggage car, at not less than 20 miles per hour.....	—— cts. " "
For each stoppage of passenger trains.....	—— cts.
Etc., etc., etc.	
For each ton of through freight, east, at not less than 15 miles per hour.....	—— cts. " "
For each ton of through freight, west, at not less than 15 miles per hour.....	—— cts. " "
For each ton of way-freight, etc., etc., etc., etc....	—— cts. " "

(This schedule should be a precise duplicate [except as to rates] of that for the Transportation Department, in order that the company may furnish to one department exactly what it must pay the other for, and make its own part merely that of transfer agent. For example, to buy *car*-miles and sell *passenger*-miles obliges the company to take part in the management and introduces hopeless discrepancies of interest.

Moreover, the prices in the above schedule should be increased from the transportation schedule by a *uniform percentage throughout*, in order that Messrs. X, Y and Z may be stimulated to the most zealous effort after that class of business which affords the largest profit. And this percentage should be as large as responsible and competent parties can be induced to consent to, under the further condition below.)

4. The said X, Y and Z, notwithstanding the above schedule of rates, shall be at liberty, at their discretion, with the consent of the company previously obtained, to take business at any rates above the following schedule [a precise duplicate of the transportation schedule], except as herein below provided. Business taken under this schedule shall be kept in a separate account, and the said X, Y and Z shall not be charged with transportation on the same, nor entitled to any share in the profits on the same other than this; that a commission of ten per cent. on the rates obtained over the reduced schedule shall be added to the profits accruing under this agreement.

(This gives every needed facility for securing all business on which the company can realize any balance of profit whatever,

and holds out a moderate inducement [2½ per cent.] for obtaining the same; but it still leaves it strongly for the *interest* of Messrs. X, Y and Z to secure the higher rates.)

No business *for particular individuals* can be taken under the reduced schedule. If that schedule is selected it must be considered to apply to all business of the same class taken from the same station at the same time.

5. The company shall allow to said X, Y and Z drawbacks on all delays in transportation occurring through fault of the Transportation Department as per the following schedule, on proper reports of the same to its accounting officers:

[The schedule should be a precise duplicate of the penalties exacted from the Transportation Department; leaving the profits of the corporation unaffected by such penalties and delays.]

6. Settlements shall be made monthly as follows:

From the gross receipts of the company of every nature and kind incidental to its business as a seller of transportation (excepting from any business taken at reduced rates under the supplementary schedule above) shall be deducted the company's charges for transportation furnished during the preceding month; as determined—in respect to quantities—from the freight-forwarded reports and reports of ticket sales and cash collections; and, in respect to prices, by the first schedule above. From the balance the company shall—

First. Pay all rolls, as turned in;

Second. Pay all bills, as per schedule rendered;

Third. Deduct all damages, actual or prospective, for injuries to persons or property arising within, or through fault of, the Commercial Department;

Fourth. Add 10 per cent. of the gross profit on all business classed under the second schedule above;

Fifth. Add the amount of all drawbacks for reported delays in transportation;

Sixth. From the resulting balance, deduct 75 per cent. as its own share of the profits;

Seventh. From the balance accruing to said X, Y and Z, deduct 10 per cent. as a guarantee fund, until the same shall amount to —— thousand dollars;

Eighth. Pay over the residue monthly in cash to the said X, Y and Z.

7. This agreement shall continue in force for —— years, at the end of which time an inventory shall be taken and the accounts of said X, Y and Z credited with the value of all betterments or deb ted with all deterioration.

[Bonds, forfeitures, conditions limitations and amplifications at discretion; also separate contracts for passenger and freight department, etc., etc.]

Having concluded these two contracts, the President and Board of Directors of the Podunk Valley Railroad Company find that they have left under their own immediate charge only the Treasurer and his (very much reduced) staff of paymasters, cashiers and auditors of various grades and for various purposes. For this staff the salary system is entirely fair and just, as well as usually the most acceptable to those who prefer that walk of life. All experience on railways and off of them shows that there is no difficulty under that system in securing the faithful and regular discharge of duties which involve the mere *handling* of money and keeping of accounts, unless the surroundings be contaminating.

All the rest of the Company's infinite variety of employes have become the employes of *individuals*, heavily interested in reducing expenses to the last dollar and in keeping at peace with all the world.

For themselves, the Board of Directors have nothing more to do than to watch over their *quasi* banking department, and at periodical intervals to provide for just settlements under past agreements and shrewd bargains under future ones. There is no reason to doubt that the corporate machinery would work thoroughly well under such circumstances. The corporation would also be relieved from the temptation to use its vast resources in covering up the transgressions and neglect of its servants. In its relations with the other two great contracting parties it will be observed that there is community of interest throughout so long as those duties are faithfully and efficiently performed, but any failure therein on the part of either one of the three great contracting parties makes the other two interested in exposing and correcting it. The machine must *move smoothly* or all must suffer. Now there is nobody suffers but the absent stockholders.

In comparison with the advantages of such a condition of affairs, the petty objections which can be raised against it sink into insignificance. Such a system as this means *health*, for it is based upon the unchanging laws of human nature and abstract justice; but, until those laws have been recognized, the land may be filled with troops, and the law books with statutes, and every other railway be operated by the State, and yet there will be no health in the railway system. And it is well that there should not be—not even outward contentment and quietude; for it is a sign of health and not weakness when inward impurities break out upon the surface and will not be driven back again by outward applications. There is something radically wrong in the social condition and surroundings of those who remain quiet under such measures. A certain species of dead-and-alive honesty is enforced sooner or later under such measures, but that does not mean *health*; and the railway system is not now in a healthy condition in any country on the globe. The true difficulty is that the military type of organization—relying as it does on centralization and authority as a motive-power—is abhorrent to the spirit of all industrial enterprises. It has an invariable tendency to make all those connected with it good consumers, poor producers, unprogressive, dictatorial, and extravagant. It is not asserted that they *are* so, but that is the tendency.

ARTHUR M. WELLINGTON.

Rapid Construction.

CAMDEN, N. J., Sept. 14, 1877.

TO THE EDITOR OF THE RAILROAD GAZETTE:

I would recommend "Slow Coach" to make a trip over the "Philadelphia & Atlantic City Railway." Without doubt he would find their "method of construction" (which is still very discernible) of "considerable interest to the profession;" if for nothing else it would serve to show what should *not* be done in building railroads. Perhaps an order that was issued that the road *must* be finished in a certain time, even if it were laid on the ground without grading, and an accident resulting in the death of a brakeman and smashing two cars, that happened on the opening excursion, may serve to illustrate the "method" aforesaid.

BROAD GAUGE.

A New Explanation of Hot Boxes.

QUINCY, Ill., Sept. 12, 1877.

TO THE EDITOR OF THE RAILROAD GAZETTE:

Some days since I heard what was to me a new reason for "hot boxes." As it may possibly be new to some of your readers who are practically interested in the matter, I venture to lay it before you.

The suggestion is that when a journal gets hot it is cooled with water, and as the water cannot be applied to the top the lower part is cooled much more rapidly, thus to a certain extent hardening that side. In subsequent wear the journal becomes more or less oval, and as a consequence "runs hot" until taken out.

I have been assured that in one case when the calipers were applied there was as much as $\frac{1}{16}$ inch difference in diameters of some journals, and after being turned down they ran 800-mile trips as cool as any journals ever did.

CHAS. BEURGAN.

Train Accidents in August.

The following accidents are included in our record for August:

REAR COLLISIONS.

On the evening of the 2d a construction train on the Quebec, Montreal, Ottawa & Occidental road ran into the rear of another construction train near Rouge Settlement, P. Q. An engine and 14 cars were wrecked and one man killed.

On the morning of the 4th a stock train on the Lake Shore & Michigan Southern Railway ran into the rear of a preceding stock train, which had stopped at Conneaut, O., and the engine and several cars were piled up in a bad wreck.

On the morning of the 8th a wild engine on the Morris & Essex Division of the Delaware, Lackawanna & Western road ran into the rear of a passenger train, which was stopping at Waterloo, N. J., breaking the rear car somewhat. The engineman jumped and broke his leg.

Early on the morning of the 9th an express train on the Chicago & Alton road ran into the rear of a freight train which had gone upon a siding in the yard at Bloomingion, Ill., but had left one car projecting over on the main track. The car was wrecked and the engine damaged.

On the afternoon of the 14th a local passenger train on the Allegheny Valley road ran into the rear of an oil train, which was standing on the track at McCandless, Pa., wrecking several cars. The oil caught fire and the whole passenger train and part of the freight were burned up. Three trainmen and two passengers were hurt.

On the evening of the 14th a freight train on the Troy & Boston road ran into the rear of a passenger train, which was standing at Hoosac Junction, N. Y., wrecking the rear car, injuring two trainmen and seven passengers. It is said that the proper signal for the freight was not displayed.

On the morning of the 15th a freight train on the Chicago, Burlington & Quincy road ran into the rear of a preceding freight at Danville, Ia., wrecking an engine and several cars, killing a man in the caboose and blocking the road several hours.

On the evening of the 15th the pay train on the Chicago & Alton road ran into some coal cars in Alton, Ill., and damaged the engine.

On the 16th a transfer train in the Union depot yard at St. Louis backed into a switching engine, doing some damage.

On the morning of the 17th a freight train on the Erie Railway ran into some cars which had broken loose from a preceding freight near Greycourt, N. Y., wrecking the caboose and fatally injuring the conductor, who died the same day.

On the evening of the 22d a freight train on the Louisville & Nashville road ran into the rear of a passenger train, which had stopped to repair some damage to the brakes, near Cedar Creek, Ky. The engine and one car were damaged. A flag had been sent back to warn the freight, but the track was wet and the brakes would not stop it in time.

On the 23d a freight train on the Lafayette, Muncie & Bloomington road ran into some empty cars, which had been blown out of a siding upon the main track at Lafayette Junction, Ind., and several of the cars were damaged.

On the morning of the 24th a freight train on the Atchison, Topeka & Santa Fe road broke in two near Stranger Creek, Kan., and the rear section ran into the forward one, damaging several cars and injuring the fireman.

On the morning of the 25th some cars broke loose from a coal train on the Albert Railway, near Hillsboro, N. B., and ran back down a grade and ran into the rear of a working train, wrecking five cars and blocking the road four hours.

On the 26th a freight train on the Columbus & Hocking Valley road ran into the rear of another freight in the yard at Columbus, O., wrecking the caboose, killing one trainman and injuring another.

On the morning of the 27th a ballast train on the Chicago & Northwestern road backed into a freight train which was standing on the track at Elgin, Ill. Two cars of the ballast train, a caboose and two other cars of the freight were wrecked and a man, who was in the caboose, badly hurt. The road was blocked two hours.

On the morning of the 28th a passenger train on the Germantown Branch of the Philadelphia & Reading road ran into the rear of a coal train, which was just going on a siding in the Philadelphia yard. The passenger engine and eight coal cars were badly broken and two trainmen slightly hurt.

On the 29th, a car load of iron broke loose from a working train on the Rochester & State Line road, and ran back down a grade to Warsaw, where it struck an engine on the track and damaged it badly.

On the night of the 29th, as a passenger train on the Springfield, Athol & Northeastern road was making a flying switch at Enfield, Mass., the brakes failed to hold and the train ran into a freight train standing on the track, wrecking a car, killing a brakeman and injuring the conductor badly.

Very late on the night of the 29th, a freight train on the New York Central & Hudson River road ran into the rear of a passenger train, which was stopping at Hudson, N. Y. The rear passenger car was badly broken, the freight engine and several cars piled up together so as to knock down a highway bridge over the track. The freight fireman was killed and the engineman badly hurt. It is said that the danger signal was not shown to the freight.

BUTTING COLLISIONS.

On the 4th, there was a butting collision between two passenger trains on the Brooklyn, Bath & Coney Island road, near Locust Grove, N. Y., by which several cars were piled up and broken and six passengers slightly hurt.

On the afternoon of the 9th, near Swatara, Pa., on the Mine Hill Branch of the Philadelphia & Reading road, there was a butting collision between a coal train and the pay train, by which both engines were slightly damaged. The pay train had orders to disregard all but schedule trains, and the coal train had been warned to look out for it.

Very early on the morning of the 12th, there was a butting collision between a passenger and a freight train on the Keokuk & Des Moines road, at Doud's, Ia., by which both engines and several cars were slightly damaged.

Near midnight on the 13th there was a butting collision between a Canada Southern express and a Lake Shore & Michigan Southern freight train on the Lake Shore track in Toledo, O. The Lake Shore engine and several cars were wrecked, the Canada Southern engine damaged and its engineman thrown out and killed.

On the 14th, at East Bloomfield, N. Y., on the Northern Central road, there was a butting collision between an excursion and a freight train, by which both engines were damaged.

On the morning of the 15th, near Lancaster, Ky., on the Richmond Branch of the Louisville & Nashville road, there was a butting collision between the regular passenger train and an excursion train, by which both engines and several cars were badly broken and a fireman hurt. The track was blocked two hours.

On the evening of the 16th there was a butting collision between a passenger train and the pay train on the Southwest Pennsylvania Branch of the Pennsylvania Railroad, near Uniontown, Pa. Much damage was done, the engineman of the passenger killed, the fireman fatally hurt and five passengers slightly injured.

Early on the morning of the 17th there was a butting collision between two freight trains on the Wabash road, near Antioch, Ind., by which both engines and several cars were wrecked, a brakeman hurt and the road blocked eight hours. It is said that the operator at Wabash allowed one of the trains to pass when he should have stopped it, and failed to notify the dispatcher that it had passed.

On the 17th there was a butting collision between two freight trains on the Grand Trunk road near Brantford, Ont., by which both engines and several cars were wrecked and a brakeman hurt.

Late on the night of the 17th there was a butting collision between two freight trains on the Louisville, Cincinnati & Lexington road, near Liberty, Ky., wrecking both engines and several cars.

Near noon on the 21st there was a butting collision between two engines in the tunnel approach to the Illinois & St. Louis Bridge in St. Louis. Both engines were damaged and a fireman hurt.

On the night of the 21st there was a butting collision between a freight and a passenger train on the Kansas City, St. Joseph & Council Bluffs road, near Savannah, Mo., by which both engines were wrecked, some cars damaged, a fireman killed, and two passengers hurt. The freight is said to have been on the passenger train's time, having left the preceding station without orders.

On the afternoon of the 29th there was a butting collision between two freight trains on the Dayton & Michigan road near Perrysburg, O., by which both engines and several cars were badly broken, a fireman hurt and the road blocked several hours. The accident is said to have been caused by disregard of orders on the part of the north-bound train.

On the 31st there was a butting collision between two engines in the Pennsylvania Railroad yard at Jersey City, N. J., by which both were slightly damaged.

CROSSING COLLISIONS.

On the night of the 17th a passenger train on the Hannibal & St. Joseph road ran into a freight train on the Kansas City, St. Joseph & Council Bluffs road at the crossing of the two roads near St. Joseph, Mo., wrecking several cars, and throwing the engine down a bank. The fireman was hurt and both roads blocked several hours.

On the 21st a passenger train on the Chicago, Burlington & Quincy road ran into a freight at the Pittsburgh, Cincinnati & St. Louis crossing in Chicago, wrecking the engine. It is said that the air-brakes on the passenger failed to work.

On the evening of the 31st a Connecticut Valley passenger train struck a peach train on the Boston & New York Air Line at the crossing of the two roads in Middletown, Conn. Both engines and two cars were forced down a bank and one of the enginemen was hurt. It is said that the accident was caused by disregard of signals.

DERAILMENTS, BROKEN RAIL.

Early on the morning of the 8th a passenger train on the Missouri Pacific road struck a broken rail near Centerview, Mo. The engine and two cars passed over, but the four rear cars were thrown from the track and upset, doing some damage and injuring 12 persons slightly.

On the 22d a freight train on the Chicago & Lake Huron road was thrown from the track by a broken rail near Flint, Mich., and 13 cars were badly broken.

DERAILMENT, BROKEN WHEEL.

On the morning of the 27th one truck of the parlor car in a train on the New York & Harlem road was thrown from the track by a broken wheel while the train was near Scarsdale, N. Y. The truck was wrecked and the car slightly damaged. The truck was stopped by striking the heavy timbers of the station platform at Scarsdale, but the car-body was not badly injured.

DERAILMENTS, BROKEN AXLE.

On the night of the 15th an axle broke under a car in a coal train on the Philadelphia & Reading road, near Tremont, Pa., and 25 cars were thrown from the track.

On the morning of the 22d a freight train on the Southwestern Division of the Chicago, Rock Island & Pacific road was thrown from the track by a broken axle near Jamesport, Mo., blocking the road nine hours.

DERAILMENTS, BROKEN BRIDGE.

On the afternoon of the 5th as a freight train on the Chicago, Milwaukee & St. Paul road was crossing a Howe truss bridge over the Kinnikinnick River, near Milwaukee, Wis., three loaded cars broke through and went down into the river. The engine remained lodged near the centre of the span, the three cars being those next to the engine. The bridge was being repaired at the time.

On the morning of the 20th a train on the Maysville & Lexington road broke through a small bridge near Carlisle, Ky., four cars going down and being badly broken.

DERAILMENTS, SPREADING OF RAILS.

On the evening of the 10th a passenger train on the New Haven & Northampton road ran off the track in Westfield, Mass., blocking the road some time. The accident was caused by the spreading of the rails.

On the 23d the caboose of a freight train on the Portland & Ogdensburg road was thrown from the track and upset near East Fairfield, Vt., by the spreading of the rails.

DERAILMENTS, WASH-OUTS AND LAND-SLIDES.

On the evening of the 25th a passenger train on the New London Northern road ran into a wash-out near Mohegan, Conn., and the engine, tender and baggage car left the track and went down into the Thames River. A rail went through the engine boiler, tearing a large hole. Six trainmen and one passenger were hurt.

Early on the morning of the 27th a freight train on the Southern Minnesota road ran into a land-slide near Mound Prairie, Minn., throwing the engine and four cars from the track and breaking them badly. The fireman was killed and the engineman hurt.

Very early on the morning of the 29th a west-bound express train on the Chicago, Rock Island & Pacific road went into the gap where a stone-arch culvert had been washed out by a sudden freshet, at Four-mile Creek, near Des Moines, Ia. The train consisted of the engine and tender, Barnum's advertising car, a baggage car, three day coaches and a sleeping coach.

The engine was thrown completely across the gap, against the opposite bank; the advertising and baggage cars were piled up on the engine, while the three passenger coaches were thrown into the gap, each one running partly through and crushing the preceding one. Naturally, there were many casualties; two trainmen, seven of Barnum's men and eight passengers were killed, besides two passengers reported missing, while two trainmen, three of Barnum's men and 31 passengers were hurt, some very badly. The track was in good condition the previous evening and the culvert was solidly built and believed to be entirely safe, but the freshet was sudden and large and carried away all the foundation.

DERAILMENTS, CATTLE.

On the night of the 10th a freight train on the Intercolonial Railway ran over a cow near Petitcodiac, N. B., and four cars were thrown from the track and damaged.

On the morning of the 15th a passenger train on the Louisville, Cincinnati & Lexington road ran over a cow in Louisville, Ky., throwing part of the train from the track and injuring five passengers.

On the morning of the 17th a passenger train on the Peoria & Rock Island road ran over a cow near Orion, Ill., throwing two cars from the track and blocking the road three hours.

On the afternoon of the 22d a New York, New Haven & Hartford train, while on the New York & Harlem track, struck four steers which had broken away from a drove and run into the tunnel at Harlem, N. Y. The whole train was thrown from the track, but little damage was done, though one track was blocked two hours.

On the morning of the 26th a stock train on the Cheshire Railroad ran over some cattle near Summit, N. H., and the engine and one car were thrown from the track. The engine upset, injuring the fireman slightly.

On the night of the 30th the engine and one car of a passenger train on the Long Island Railroad were thrown from the track near Hunter's Point, N. Y., by a cow which had got fast in a bridge.

DERAILMENTS, ACCIDENTAL OBSTRUCTION.

On the 2d a special passenger train on the Philadelphia & Reading road struck a push car which some track hands had left on the track near Tamaqua, Pa. The engine was thrown down a bank and badly broken and the car upset, injuring two men slightly.

On the night of the 12th a freight train on the Ohio & Mississippi road ran into a tree which had been blown down across the track near Shield's Mill, Ind., and the engine and 16 cars were thrown from the track.

DERAILMENTS, MISPLACED SWITCH.

On the morning of the 4th the engine of a train on the Brooklyn, Bath & Coney Island road was thrown from the track near Coney Island, N. Y., by a misplaced switch.

On the 10th the engine and six cars of a freight train on the Peoria & Rock Island road were thrown from the track by a misplaced switch at Milan, Ill., injuring the fireman and blocking the road four hours.

Late on the night of the 14th a St. Louis, Keokuk & Northwestern freight train was thrown from the track by a misplaced switch on the Missouri, Kansas & Texas track in Hannibal, Mo. The engine and two cars went down a bank, the engine being upset and badly broken. The engineman was badly and the fireman slightly hurt.

Near noon on the 25th the engine and one car of a Jeffersonville, Madison & Indianapolis passenger train were thrown from the track by a misplaced switch on the Union track in Indianapolis, Ind.

On the evening of the 27th seven cars of a freight train on the Erie Railway were thrown from the track in the yard at Hornellsville, N. Y., by a misplaced switch, blocking the track an hour and a half.

DERAILMENTS, LOOSE OR OPEN DRAW.

On the morning of the 9th a passenger train on the Long Branch Line of the Central Railroad of New Jersey ran off the track on the draw-bridge over Shrewsbury River, near Oceanport, N. J. The engine and one car passed nearly over the bridge and ran off to one side of the track, but on land; the two following cars went off the bridge and upset into the river, the rear car only remaining on the track. There were many persons on the train, of whom 70 were more or less injured and five of that number have since died. The evidence tends to show that the draw was not fastened and that it shifted while the train was on it, enough to break the connection of the rails at the end. The Coroner's jury censured the bridge-tender for not seeing that it was fast before signaling the train to come on.

On the afternoon of the 28th the engine of a peach train on the Harlem River Branch of the New York, New Haven & Hartford road went through the open draw of the bridge over the Bronx River, near West Farms, N. Y. The engine and tender went down into the river, the engine being badly damaged; the engineman jumped into the river and was drowned. It is stated that the danger signal was displayed and that the engineman attempted to stop the train, but the brakes would not stop it soon enough.

DERAILMENTS WITH MALICIOUS INTENT.

Very early on the morning of the 2d a car of an express train on the Pittsburgh, Cincinnati & St. Louis road was thrown from the track by some ties which had been piled up on the rails.

On the morning of the 6th a passenger train on the Lehigh & Susquehanna Division of the Central Railroad of New Jersey was thrown from the track at Pleasant Valley, Pa., by some stones, which are believed to have been put on the track by striking miners.

On the morning of the 12th a passenger train on the Lehigh Valley road was thrown from the track at Packerton, Pa., by a switch, which is believed to have been purposely misplaced by striking miners.

On the morning of the 27th a passenger train on the Delaware & Hudson gravity road was thrown from the track by a misplaced switch near Honesdale, Pa. The parlor car was thrown down a bank and a trainman hurt. The switch was spiked open, and is believed to have been misplaced by striking miners.

DERAILMENTS, UNEXPLAINED AND MISCELLANEOUS.

On the 1st two cars of a freight train on the Pennsylvania Railroad were thrown from the track near Monmouth Junction, N. J., and damaged. Two tramps, who were stealing a ride, were badly hurt.

Very early on the morning of the 2d four cars of a freight train on the St. Louis, Iron Mountain & Southern road ran off the track near Marquand, Mo., blocking the road several hours.

Early on the morning of the 3d the tender and four cars of a passenger train on the St. Louis, Iron Mountain & Southern road ran off the track near Ironton, Mo., and the cars upset and were much damaged. Seven passengers and two tramps, who were stealing a ride, were hurt.

On the night of the 6th the engine and nine cars of a freight train on the Chicago & Paducah road were thrown from the track near Bement, Ill., and piled up in a bad wreck.

On the morning of the 7th a new engine, running wild, jumped the track near Lagrange, Mo., on the St. Louis, Keokuk & Northwestern road, and was badly damaged. The track was blocked five hours. The cause is said to have been fast running.

On the 7th the engine and three cars of a passenger train on the Missouri, Kansas & Texas road ran off the track at Rensselaer, Mo. The accident was caused by the removal of a bolt from the lower end of the switch standard.

On the evening of the 7th the engine of a freight train on the Cleveland & Pittsburgh road ran off the track at Hudson, O., blocking the road two hours.

On the evening of the 7th some cars of a freight train on the Little Miami road ran off the track near South Lebanon, O., blocking the road several hours.

On the afternoon of the 9th the rear car of a passenger train on the St Joseph & Western road jumped the track near Troy, Kan., and ran down a high bank. The car was completely wrecked, two persons fatally and 23 less severely injured.

On the evening of the 10th a Portland & Ogdensburg freight train ran off the track on the Boston, Concord & Montreal track near the White Mountain House, N. H. Several cars were wrecked and the track blocked all night.

On the night of the 10th the engine and five cars of an express train on the Eastern Railroad ran off the track and down a high bank near Seabrook, N. H., doing much damage.

Early on the morning of the 12th two cars of an Indianapolis, Cincinnati & Lafayette freight train ran off the track on the Union track in Indianapolis, Ind., blocking the track several hours.

On the 13th a freight train on the Illinois Central road ran off the track near Decatur, Ill., wrecking several cars and killing three trainmen.

On the 17th four cars of a construction train on the Minneapolis & St. Louis road ran off the track near Minneapolis, Minn., and one man was hurt.

On the afternoon of the 17th an express train on the Philadelphia & Erie road ran off the track near Dauphin, Pa., and the engine was damaged.

Late on the night of the 17th the engine of a transfer freight train on the Illinois & St. Louis Bridge track ran off the track in East St. Louis, Ill., blocking the road some hours.

On the morning of the 18th several cars of a freight train on the Missouri, Kansas & Texas road ran off the track near Lewis, Mo. A brakeman and two passengers in the caboose were hurt.

On the 23d the engine of a coal train on the Intercolonial Railway ran off the track near Maccan, N. S., and was slightly damaged.

On the evening of the 23d a freight train on the Peoria, Pekin & Jacksonville road ran off the track near Jacksonville, Ill., blocking the road all night.

On the morning of the 28th the rear car of a passenger train on the Vandalia Line ran off the track in East St. Louis, Ill. It is said that the accident was caused by the bending of an axle.

On the morning of the 28th a wild engine on the Pittsburgh & Castle Shannon road jumped the track near Castle Shannon, Pa., and fell over on its side, crushing one man to death and injuring two others badly. The engine had eight men on board and was running very fast.

On the 28th a freight train on the Indianapolis, Cincinnati & Lafayette road ran off the track at Hansell's, Ind., wrecking several cars. Two tramps, who were stealing a ride between two cars, were killed and two others badly hurt.

On the evening of the 28th a passenger train on the Richmond Branch of the Louisville & Nashville road ran off the track near Gilbert's Creek, Ky., blocking the road two hours.

On the afternoon of the 29th the engine and baggage car of an express train on the Eastern Railroad ran off the track near South Berwick, Me., damaging the tender badly and tearing up the track for some distance.

BOILER EXPLOSIONS.

On the evening of the 5th the boiler of an engine on the Mississippi Central road exploded while the engine was on the inclined plane at Fillmore, Ky. The engine was much damaged.

On the afternoon of the 13th the boiler of the engine attached to a freight train on the Atlanta & Charlotte Air Line exploded near Mount Airy, Ga., wrecking the engine.

On the morning of the 19th, as the engine of a freight train on the Hannibal & St. Joseph road was standing in the yard at St. Joseph, Mo., the boiler exploded, tearing out the back sheets of the fire-box and wrecking the back end of the engine. The fireman was scalded so that he died in a few hours; the engineman and the shop foreman, who was on the engine, were thrown some distance and badly hurt. The engineman, just before the explosion, had noticed a small leak at a stay-bolt, and the men were examining it.

OTHER ACCIDENTS.

On the morning of the 2d, as a passenger train on the Chicago, Milwaukee & St. Paul was near Russell, Wis., one of the parallel rods broke, breaking the cab and tearing a hole in the boiler. The engineman was badly scalded.

On the afternoon of the 16th a car loaded with charcoal in a freight train on the Utah Southern road caught fire near Draper, Utah, and was destroyed.

On the 20th a car in a freight train on the Detroit, Lansing & Northern road caught fire near Portland, Mich., and was destroyed.

This is a total of 98 accidents, whereby 46 persons were killed and 220 injured. Eighteen accidents caused the death of one or more persons, 27 caused injury less than death, while 53, or 54 per cent. of the whole, caused no injury serious enough for record.

These accidents may be classed as to their nature and causes as follows:

COLLISIONS:	
Rear collisions	20
Butting collisions	14
Crossing collisions	3
	— 37
DERAILMENTS:	
Unexplained	23
Broken rail	2
Broken wheel	1
Broken axle	2
Broken bridge	2
Spreading of rails	2
Wash-out	2
Land-slide	1
Cattle on track	6
Accidental obstruction	2
Misplaced switch	7
Open draw	1
Unsecured draw	1
Malicious obstruction	2
Switch-bolt out	1
	— 55
Boiler explosion	3
Broken connecting rod	1
Cars burned while running	2
Total	98

Four collisions were caused by mistakes in orders or failure to obey them; three by want of or failure to use signals; three by trains breaking in two; one by cars blown out of a siding; one by failure in brakes; one by a flying switch, and one by carelessness in sidetracking a train. Eighteen accidents are traced directly to defect or failure of road or equipment. Of the derailments 26 were of passenger and 29 of freight trains; three collisions were between two passenger trains, 18 between a freight and a passenger, and 16 between freight trains; of the other accidents five were to freight and one to a passenger train.

As compared with August, 1876, there was an increase of 20 accidents, of 24 in the number killed and of 144 in that injured.

The number of accidents is very large as compared with the earlier summer months, and without apparent reason, for the usual causes of the season do not appear in very great number. It is remarkable that so very few accidents are recorded as resulting from the great strike, which, on most roads, extended over into the month. The collisions form a larger proportion than usual of the whole number of accidents, and some of them may be due to the rush and confusion of traffic following the strike, but very few can be traced directly to the disturbances, and there were but four cases of malicious derailment, two by misplaced switches and two by obstructions on the track. August is frequently marked by sudden and violent storms, but this year only one land-slide and two wash-outs are noted, one of the latter, however, being more fatal to human life than any accident since the Ashtabula disaster. There are an unusual number of killed and injured recorded, which is due chiefly to three accidents resulting in a large number of casualties, the Rock Island wash-out causing the greatest number of deaths, though the Oceanport draw-bridge accident had the largest number of injured. The Rock Island disaster seems to have been one of those which can hardly be prevented by any ordinary care, but the other must be attributed, as has been heretofore pointed out, partly to carelessness of employes and partly to defective methods of car construction.

For the year ending with August the record is as follows:

	No. of accidents.	Killed.	Injured.
September	106	41	132
October	103	40	115
November	96	23	135
December	88	94	141
January	147	10	148
February	56	5	41
March	58	9	31
April	69	13	34
May	46	11	41
June	49	16	92
July	53	21	144
August	98	46	220
Totals	969	330	1,275

The averages per day for the month were 3.16 accidents, 1.48 killed and 7.08 injured; for the year they were 2.65 accidents, 0.90 killed and 3.49 injured. The average casualties per accident were for the month 0.469 killed and 2.245 injured; for the year, 0.341 killed and 1.316 injured.

Railroad Traveling, Passenger and Advertising Agents' Association.

The fifth annual convention of this association was held in Chicago, Sept. 12, a large number of members being present. President V. M. Came called the meeting to order and made an address, setting forth the objects of the association and its advantages in mutual assistance and protection. Short addresses to the members were made by General Passenger Agents Carpenter, of the Chicago, Milwaukee & St. Paul, and Hitchcock, of the Chicago, Burlington & Quincy, who were present by invitation. The convention then selected Kansas City as the place for holding the next convention, and the first Wednesday in September, 1878, as the time, a motion to change the time being voted down.

At the second day's session the vote fixing the place for next year's meeting was reconsidered and Cincinnati was selected. Mr. Frank E. Myers, of the Pennsylvania, was chosen to deliver an oration at the next meeting. The association then adjourned to a steamer of the Goodrich Line for an excursion on the lake, closing with a collation and speeches.

A closing session was held after the excursion, at which a resolution was adopted strictly limiting active membership to traveling agents of railroad and steamboat lines. Resolutions of respect to two deceased members, Messrs. W. W. Chittenden (killed at Ashtabula) and A. L. Norton were adopted, and the convention adjourned.

General Railroad News.

THE SCRAP HEAP.

Railroad Manufactures.

The Cleveland (O.) Spring Co. manufactures locomotive, car and carriage springs, and now employs from 75 to 80 men, doing a fair business.

The Hopkins lead-lined journal bearing, manufactured by George R. Meneely & Co., of Troy, N. Y., has recently been adopted by the Delaware & Hudson Canal Co., the Rome, Watertown & Ogdensburg, the Housatonic and the Western Railroad of Alabama, for their entire equipment.

The Franconia Iron & Steel Co. has closed its works at Wareham, Mass., for repairs.

The rail mill of the Pennsylvania Iron Works, at Danville, Pa., has been started up on some orders for iron rails. The Company's No. 3 furnace has gone out of blast after running for over a year.

Moselem Furnace in Richmond Township, Pa., was sold recently to Leibrand & McDowell, of Philadelphia, for $200 in addition to a mortgage of $100,000.

The Thomas Iron Co., at Hokendauqua, Pa., has increased the working force and is making preparations for taking out more ore from its mines.

The Ferndale (Pa.) Rolling Mill started up last week.

The Jefferson Rolling Mill, at Steubenville, O., was to resume work Sept. 10.

The Burgess Iron & Steel Co., at Portsmouth, O., is putting up new steel works, the furnaces of which are to be heated by gas.

The Terre Haute (Ind.) Car Works are building 50 box cars for the Illinois Midland, and rebuilding 120 stock cars as box cars for the Western Car Co.

The Baltimore & Ohio shops at Zanesville, O., have begun work on a large number of new freight cars for the road.

The Louisville Car Wheel Works are making about 40 wheels per day.

The Portland Company, at Portland, Me., now employs 300 men, and its shops are full of work. Some cars are being built, but the principal work on hand is in changing the gauge of engines for the European & North American and its tributary lines.

The strike at the extensive iron works of Jones & Loughlins, at Pittsburgh, ended Sept. 18, the men returning to work at the old wages after a stoppage of eight weeks.

Railroad Employes Buying Farms.

The Omaha *Bee* of Sept. 12 says: "The employes of the Chicago, Burlington & Quincy Railroad have formed an association for the purpose of buying 53,000 acres of Nebraska land from the Burlington & Missouri River Land Company.

The objects in view are: First, the obtaining of a good, secure investment for savings; second, the securing of lands at the present very low prices; third, to obtain by combination wholesale prices on the lands. The association has made a proposition to the Land Department to buy 50,000 acres of land in different counties south of the Platte River in Nebraska, with an average appraised credit price of $4 per acre, the same to be turned over to the association at the rate of $1.80 per acre, payable in monthly installments extending over two years. Under this plan any Chicago, Burlington & Quincy employe can buy, say 80 acres of land, appraised at $4 per acre, credit price, for $1.80 per acre, total $144, which would probably be paid in monthly installments of $6 per month, extending over two years, without interest. Thus a man can get a farm for the small payment of $1.50 per week for two years."

A New Way to Build a Depot.

The Baltimore *Gazette* of Sept. 12 says: "An excursion took place yesterday on the Western Maryland Railroad to this city and Annapolis. The train, consisting of ten cars, arrived at the Hillen street depot at 8.30 a. m., and the excursionists, numbering about 490 persons, took the steamer Matilda for Annapolis, returning to the city early in the afternoon. The train for home left the Hillen street station at 6 p. m. The excursionists were composed of parties from Westminster and points east of Mechanicstown. The excursion was for the purpose of procuring funds to build a new depot at Westminster, and not to remove the Fulton street depot to that place, as generally reported."

Bridge Contracts.

Proposals for bridge work will be received as follows: By the Bridge Committee of the City Council of Sterling, Ill., until Sept. 25, for an iron or combination bridge over Rock River of six spans, 171 feet each, with roadway 18 feet clear width and two five-feet sidewalks.

By the County Commissioners of Hamilton County, O., at the Auditor's office in Cincinnati, for a bridge over Muddy Creek, 150 feet span, 18 feet roadway. Proposals received until Sept. 29.

At the office of the Board of Improvements in Cleveland, O., until Sept. 27, for the labor and material necessary for the erection and completion of the iron superstructure and supports for that portion of the Superior street viaduct east of and spanning the Cuyahoga River. The structure will consist of six fixed spans of about 600 feet aggregate length, resting upon iron supports except at extreme ends, and one draw or pivot bridge of 332 feet approximate length. Separate bids will also be received at the same time and place for the construction of iron hand rails upon said structures, together with about 2,900 lineal feet of railing upon that portion of the viaduct constructed of stone.

A New Railroad Signal.

The *American Manufacturer* says: "The block signals on the Pennsylvania Railroad are being improved upon. Instead of the color signals, which are liable to be mistaken in certain conditions of the atmosphere, a new signal has been devised, consisting of two horizontal arms, made of iron, perforated with two large holes to allow the wind to pass through, and erected on a high post just outside the signal-tower window. The upper arm governs east-bound trains, the lower one west-bound trains. When the arm is horizontal, it indicates red or black (a full stop). When it is elevated at an angle of forty-five degrees, it denotes green, which means caution. When the arm is vertical, it indicates white, or a clear track. At night time there are to be colored lights—red, green and white—which move with the arm to the different positions. The new signal has been placed in position at Shady Side station, and at one or two other stations on the Middle and Eastern divisions. As yet it is only regarded as an experiment, but from what has been developed already, it will probably be adopted for the entire road."

The new signal described is the semaphore, so generally used in Europe on nearly all railroads.

Slipping of Driving Wheels on Grades.

A French engineer, M. Rabeuf, has lately been led to study the phenomenon of slipping of wheels of locomotives, which appears to be a more general and complex phenomenon than has been supposed hitherto. He observed, in going down an incline of 0.005 in a metre, with a speed of 120 kilometres (74½ miles) per hour, that the real velocity of the coupled wheels was 360 turns per minute, instead of 303 turns, which would correspond to the rate of translation. He finds from further inquiry that the slipping is almost *nil* in ascending an incline, but that it is always very notable in descending. It increases very rapidly with the speed, but appears to be greater, for the same velocity, in descents than in ascents. Its suppression, if possible, would cause a considerable economy in consumption of fuel and in wear of machinery.

Fall of Another Truesdell Bridge.

The Dixon, Ill., *Telegraph* of Sept. 6 says:

"A Truesdell iron bridge, built across the Pecatonica River eight years ago, fell a few days since. The bridge was of three spans, and was built at a cost of $7,000; the spans are 70 ft. in length, and the entire frame of iron. Its fall was caused by a boy driving four cows across the bridge on a run; the boy and cows were precipitated into the river below, a distance of 20 ft., and, strange to say, boy and all the cows save one escaped serious injury. The bridge was of the same pattern as the one that fell here four years ago."

RAILROAD LAW.

Employes Cannot Recover Damages Unless Free from Fault.

In the case of McDade against the Georgia Railroad & Banking Co., recently, the Georgia Supreme Court held, on appeal from the De Kalb County Circuit, as follows:

1. Where the official printed schedule, furnished to conductors and locomotive engineers, prescribes a given hour and minute for leaving the starting terminus, and no provision is made in the rules and regulations for starting at any other time, to enter on the trip fifteen minutes after the prescribed time has expired is to vary from the schedule; and if done without express authority from the superintendent or the proper general officer of the road, it is a breach of orders.

2. For conductors and engineers to abide absolutely and invariably by the schedule furnished them for running trains, except when clearly and expressly authorized to vary therefrom, is of the last importance to both life and property; and where the printed rules which accompany the schedules warn both classes of employes that they will be held responsible for the satisfactory running of the schedules, an engineer cannot excuse himself for commencing a trip fifteen minutes after his schedule time has expired, by the fact that he acted under orders from the conductor. The schedule being prescribed by their common superior, neither could absolve the other from his obligation to observe it.

3. When, according to regular schedule, one railroad train is to arrive at a given point thirteen minutes before the time fixed for another train to leave that point daily on a new trip, such point is a terminus as to the latter train, and not a meeting point as to either; especially, when real meeting points are plainly designated as such on the schedule, and the designation is omitted in respect to the point in question.

4. Under the law, which inhibits a recovery by an employe, when not free from fault himself, the verdict is contrary to evidence. Judgment reversed.

Civil Engineers' Liens.

In the case of the Pennsylvania Railroad Company, appellant, against Duffer, the Supreme Court of Pennsylvania held that certain statutes giving a lien to contractors, laborers and workmen upon railroads and other property of public companies, for debts accruing to them in consequence of the construction or repairs of such property, do not include civil engineers, although they be required to render service to the company from the commencement to the completion of the work.—*Railway World.*

The Connecticut Constitution on Railroad Aid.

The people of Connecticut are to vote in October on two amendments to the State constitution, one of which is as follows:

"No county, city, town, borough or other municipality shall ever subscribe to the stock of any railroad corporation, or become a purchaser of the bonds, or make donation to, or loan its credit, directly or indirectly, in aid of any such corporation; but nothing herein contained shall affect the validity of any bonds or debts incurred under existing laws, nor be construed to prohibit the General Assembly from authorizing any town or city to protect, by additional appropriations of money or credit, any railroad debt contracted prior to the adoption of this amendment."

Railroad Amendment to the Maine Constitution.

At the recent election in Maine the people voted by a large majority to ratify an amendment to the State Constitution, providing that no city or town shall incur any liability or issue any bonds in aid of any railroad corporation to an amount in excess of 5 per cent. of assessed value of the property liable to taxation in such city or town.

ANNUAL REPORTS.

Connecticut & Passumpsic Rivers.

This company owns a line from White River Junction, Vt., northward to Derby on the Canada line 110.3 miles, and it leases (and practically owns) the Massawippi Valley road, which extends from Derby to Sherbrooke, P. Q., 34.7 miles, with a branch to Stanstead, P. Q., 2 miles, making 147 miles in all. The company also, in conjunction with the Boston, Concord & Montreal, works the Southeastern Railway of Canada, from St. Johns to Newport, 79 miles, but the earnings of that line are not included. The thirty-second annual report covers the year ending June 30, 1877.

The equipment consists of 27 locomotives; 23 passenger train cars; 660 freight cars; 7 snow-plows and gongers and 127 road and service cars.

The company owns 2,200 acres of wood-land and 70 houses and other buildings along the line and not used for the road. The general account at the close of the year was as follows:

Stock ($17,725 per mile)		$2,175,700 00
Bonds ($11,888 per mile)		1,311,300 00
Notes payable		160,000 00
Balances, sundry accounts		9,132 82
Earnings		230,814 97
Reserve		391,467 57
Total ($38,789 per mile)		$4,278,415 36
Construction ($31,260 per mile)	$3,447,825 29	
Southeastern Ry. notes	228,806 86	
Missisquoi & Clyde Rivers bonds	350,000 00	
Mt. Washington R. R. stock	13,600 00	
Land notes	8,138 79	
Cash balances, cash and materials	230,044 42	
		$4,278,415 36

The bonds and notes falling due Dec. 1, 1876, amounting to $678,000 in all, have all been paid except $1,800 bonds not yet presented. The money needed for this purpose was borrowed at a low rate of interest, and is to be repaid from the proceeds of the consolidated bonds, which are now selling at 103. The entire funded and floating debt is $1,471,300, which will be covered by the authorized issue of $1,500,000 consolidated bonds. The ordinary floating debt has been paid off.

The work done for the year was as follows:

	1876-77.	1875-76.	Inc. or Dec.	P. c.
Train mileage, passenger	252,927	249,468	Inc. 3,459	1.4
" " freight	143,609	129,517	Inc. 14,092	10.9
" " service	9,609	4,568	Inc. 5,041	110.4
Total	406,145	383,553	Inc. 22,592	5.9
Passengers carried	166,183	172,938	Dec. 6,755	3.9
Passenger mileage	5,619,829	5,170,347	Inc. 449,482	8.7
Tons freight carried	136,869	127,888	Inc. 8,981	7.0
Tonnage mileage	7,618,721	6,885,104	Inc. 813,617	12.0
Av'ge pass. train load, No.	22.22	20.73	Inc. 1.49	7.2
Av. freight train load, tons.	53.05	52.54	Inc. 0.51	1.0

Of the passengers carried 108,398 were local and 57,785 were to or from other roads; 203,450 mileage tickets were sold. The freight traffic showed a large increase, but with a decrease of rates. The earnings for the year were as follows:

	1876-77.	1875-76.	Inc. or Dec.	P. c
Passengers	$230,714 02	$254,824 87	Dec. $24,110 85	9.5
Freight	333,823 76	345,628 22	Dec. 11,804 46	3.4
Mails	19,978 74	21,959 49	Dec. 1,980 75	9.0
Express	8,000 00	8,000 00		
Rents	12,079 15	7,141 29	Inc. 4,937 86	69.5
Total	$604,595 67	$637,553 87	Dec. $32,958 20	5.2
Expenses	360,285 35	396,599 32	Dec. 36,313 97	9.2
Net earnings	$244,310 32	$240,954 55	Inc. $3,355 77	1.4
Gross earn. per mile	4,112 90	4,337 10	Dec. 224 20	5.2
Net " " "	1,661 97	1,639 15	Inc. 22 82	1.4
Per cent. of exps.	59.59	62.21	Dec. 2.62	4.2

The disposition of net earnings was as follows:

Coupons on bonds and other interest	$130,273 62
Balance of floating debt	54,110 53
Leaving balance of earnings on hand	59,926 17
Total	$244,310 32

While it was deemed best to apply the earnings to reduction of the debt, the board expects that dividends can be resumed hereafter and the net surplus, after paying interest, divided among the stockholders. The report further says:

"There has been no change in our business relations with connecting roads since our last report, the arrangement with the Boston, Concord & Montreal road, in regard to the lease of the Southeastern, continuing as heretofore. The road and equipment have been kept in good repair, and the track, bridges and buildings are in better condition than a year ago; a long piece of trestle-work on the Massawippi road has been filled, and the yard at Newport has been extended by filling near the wharf. Two hundred tons of steel rails, and 799 tons of new iron rails have been laid during the year; 7,503 rails have been taken up, repaired and relaid; 67,370 new sleepers have been laid in the track during the year.

"Two employes of the company (brakemen) have been killed during the year—one at Barton, in the act of coupling cars, and the other at Newport, by the non-working of a switch. No blame attached in either case. Our trains have run very regularly and with few accidents; the only one of much account was a collision last September between a passenger and freight train, near Passumpsic, which resulted in badly damaging the engines and injuring four of the passengers; the damages have all been repaired and all claims for injuries settled. The loss by fire has been small and covered by insurance. No addition has been made to the equipment of the road, which remains the same as last year, and is more than sufficient for the present business. One new engine has been built to take the place of one worn out, another is in progress of building, and the general condition of cars and locomotives has been improved from a year ago. The inability of Col. Foster to obtain the promised funds from England has prevented his completing the Southeastern road, between Waterloo and Acton, and we are running under the lease the same number of miles as at last report."

The Minor Illinois Railroads in 1875-1876.

The following figures are from the reports made to the Illinois Railroad and Warehouse Commission for the year ending June 30, 1876. The table includes all those roads which do not otherwise report their operations or are not leased by other companies.

NAME OF ROAD.	Mileage of road.	Equipment. Locomotives.	Equipment. Passenger train cars.	Equipment. Freight and other cars.	Liabilities. Stock.	Liabilities. Funded debt.	Liabilities. Floating debt.	Traffic. Train mileage.	Traffic. Passenger mileage.	Traffic. Tonnage mileage.	Earnings. Gross earnings.	Earnings. Expenses.	Earnings. Net earnings.	Earnings. Earnings per mile.	Earnings. Per cent. of expenses.
					$	$	$				$	$	$	$	
Cairo & St. Louis	147	13	8	398	5,000,000	2,500,000	147,554	332,519	.....	.....	295,778	323,375	*27,597	2,019	109.3
Cairo & Vincennes	157	11	12	243	.....	.....	.....	231,679	1,483,625	7,907,367	218,033	230,903	*12,870	1,389	105.9
Carbondale & Shawneetown	18	1	1	57	356,200	227,440	786	26,000	.....	.....	31,155	20,044	11,111	1,780	64.3
Chicago, Danville & Vincennes†	159	29	14	1,092	.....	.....	.....	703,894	3,620,473	45,580,588	829,031	517,407	311,624	5,230	62.4
Chicago & Pacific	88	5	12	87	345,000	.....	.....	151,160	2,113,040	1,752,370	176,529	137,746	38,783	2,006	78.0
Chicago & Paducah	156	6	8	204	4,099,700	2,961,000	44,220	.....	.....	.....	379,422	185,337	194,085	2,432	41.0
Chicago, Pekin & Southwestern	85	2	4	43	1,168,200	1,000,000	100,000	59,762	.....	.....	99,016	52,722	46,294	1,320	53.3
Cincinnati, Lafayette & Chicago‡	75	10	3	557	1,929,200	1,591,000	266,437	298,393	.....	.....	413,341	241,683	171,658	5,511	58.0
Decatur, Sullivan & Mattoon§	32	1	.....	.....	.....	.....	.....	19,800	.....	.....	29,202	22,185	7,017	913	76.0
East St. Louis & Carondelet	12	3	.....	27	300,000	200,000	30,000	.....	.....	.....	77,550	45,248	32,302	6,463	58.3
Evansville, Terre Haute & Chicago	55	7	6	316	450,000	1,000,000	109,368	.....	.....	.....	220,430	127,562	92,868	3,988	57.3
Galena & Southern Wisconsin	31	2	1	32	177,400	252,000	34,499	38,688	.....	.....	23,751	13,033	10,718	716	58.0
Gilman, Clinton & Springfield‖	111	10	7	332	.....	.....	.....	306,086	888,043	19,898,526	262 077	249,952	32,125	2,529	88.6
Grand Tower¶	25	6	3	60	1,000,000	.....	.....	33,300	.....	.....	75,419	68,287	7,132	3,017	90.6
Hannibal & Naples	50	.....	.....	.....	457,000	900,000	.....	157,657	1,076,136	4,567,759	132,835	166,614	*33,778	2,678	125.0
Havana, Rantoul & Eastern	40	2	2	93	214,000	1o,000	100,000	78,878	93,123	153,560	15,181	12,465	2,716	.....	82.1
Illinois Midland	176	13	17	242	2,000,000	4,175,000	632,723	349,092	1,025,548	6,087,693	261,460	263,255	*1,795	1,488	100.6
Illinois & St. Louis**	18	4	4	262	1,360,100	200,000	13,557	111,576	.....	.....	173,909	94,139	79,770	9,662	54.1
Indianapolis, Decatur & Springfield††	85	6	10	276	500,000	2,727,000	19,522	67,945	.....	.....	70,041	59,075	11,966	824	85.9
Iron Mountain, Chester & Eastern	41	2	2	31	275,000	.....	.....	.....	.....	.....	28,384	29,130	*746	697	103.0
Jacksonville, Northwestern & Southeastern	30	2	2	39	375,847	610,000	6,823	.....	.....	.....	41,352	22,899	18,453	1,378	55.3
Lafayette, Bloomington & Mississippi	80	.....	.....	.....	1,000,000	1,300,000	.....	155,475	1,980,044	3,144,078	166,122	108,691	57,431	2,068	65.4
Louisville, New Albany & St. Louis	27	2	2	10	1,813,350	1,137,000	178,534	14,256	95,312	.....	12,885	13,206	*321	469	102.5
Paris & Danville	103	..	4	74	1,612,100	2,500,000	275,000	107,500	.....	.....	166,220	143,481	22,739	1,205	86.3
Pekin, Lincoln & Decatur	67	..	.....	.....	1,500,000	1,076,000	.....	142,907	1,404,471	4,312,674	156,652	124,685	31,967	2,331	79.6
Peoria, Pekin & Jacksonville‡‡	83	13	13	184	1,239,700	2,000,000	.....	310,070	.....	.....	282,705	263,706	18,999	3,406	93.3
Peoria & Rock Island§§	91	9	7	107	1,859,150	2,039,000	166,533	309,880	.....	.....	345,598	236,575	109,023	3,798	68.5
St. Louis, Marine & Edwardsville	8	1	2	6	.....	58,000	2,182	13,500	.....	.....	18,134	15,962	2,172	2,267	88.0
St. Louis, Rock Island & Chicago‖‖	275	30	21	949	.....	.....	.....	684,435	4,375,823	12,762,839	460,241	348,128	112,113	1,671	75.6
Springfield & Northwestern	47	3	.....	18	180,000	.....	.....	.....	.....	.....	59,112	50,049	9,063	1,258	84.7
Sycamore & Cortland	5	1	2	2	40,000	.....	3,000	11,219	142,670	138,748	18,778	16,539	2,239	3,813	88.0
Toledo, Peoria & Warsaw¶¶	247	44	25	788	.....	.....	.....	1 080,160	.....	.....	1,385,150	1,282,051	103,099	5,608	92.6

* Deficit.
† Includes leased entrance into Chicago.
‡ Passengers carried, 115,045; tons carried, 233,482.
§ Tons freight carried, 16,468.
‖ Expenses include renewals and improvements.
¶ Tons freight carried, 106,505, chiefly coal.
** Tons freight carried, 223,744, chiefly coal.
†† Operations for seven months only; passengers carried, 37,630; tons freight, 40,990.
‡‡ Passengers carried, 61,743; tons freight, 229,607.
§§ Passengers carried, 112,797; tons freight, 163,398.
‖‖ For eight months only.
¶¶ Includes 17 miles leased; tons freight carried, 649,003.

The Cairo & Vincennes, Chicago, Danville & Vincennes, Decatur, Sullivan & Mattoon, Gilman, Clinton & Springfield and the Toledo, Peoria & Warsaw reports are from receivers, who report no means of ascertaining stock and debt. Three roads, the Cairo & St. Louis, the Galena & Southern Wisconsin and the Havana, Rantoul & Eastern are of 3 ft. gauge; the rest of standard gauge. Eleven of the roads in the table were in the hands of receivers during all or part of the year, and only six of them had net earnings sufficient to pay interest on their debts.

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CONTENTS:

Editorial Announcements.

Passes.—*All persons connected with this paper are forbidden to ask for passes under any circumstances, and we will be thankful to have any act of the kind reported to this office.*

Addresses.—*Business letters should be addressed and drafts made payable to* THE RAILROAD GAZETTE. *Communications for the attention of the Editors should be addressed* EDITOR RAILROAD GAZETTE.

Advertisements.—*We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay,* EXCEPT IN THE ADVERTISING COLUMNS. *We give in our editorial columns* OUR OWN *opinions, and those only, and in our news columns present only such matter as we consider interesting and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.*

Contributions.—*Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies, the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and in their management, particulars as to the business of railroads, and suggestions as to its improvement. Discussions of subjects pertaining to* ALL DEPARTMENTS *of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.*

THE KENTUCKY RIVER BRIDGE.

In the *Railroad Gazette* of Jan. 19 of this year we gave a brief description of the progress made in this great structure up to that date. We have since received the series of excellent photographs taken by Mr. J. Mullen, of Lexington, Ky., from which engravings published in this and the two preceding numbers of the *Railroad Gazette* have been made.

No drawback occurred in the erection of the structure after the publication of our first account of it, and the final closure of the two halves of the bridge took place on February 20, and the bridge was subjected to a series of tests of great severity on April 20, which closed its history as a problem in solution. To recapitulate this history somewhat: The Kentucky River at the point where it is crossed by the Cincinnati Southern Railway, flows between two walls of limestone rock from 300 to 450 ft. high—almost perfectly vertical, and varying from 1,000 to 1,300 ft. apart. This canon is extremely tortuous, and the stream flowing through it is about 300 ft. in width at ordinary stages. The maximum rise above low water is 57 ft., and the extreme flood speed observed during the construction of the bridge was eight miles per hour. Steamboats run up to and above the bridge site, and the lumber traffic is quite heavy, rafts frequently passing the bridge at the rate of twenty per hour during the freshet seasons. As the river makes a sharp bend just under the bridge, a pier in the waterway was inadmissable, and the fact that on the north shore the bed rock was covered with a treacherous soil, full of springs, easily scoured, and 58 feet deep, made the question of foundations on that side a very serious one both as to cost and safety. To meet all these contingencies it was decided, first, that three spans of 375 ft. each were required in order to give sufficient raft room and to avoid the costly foundations necessary on the north side; next, that as the great height rendered falsework costly for the shore spans, and the frequency of floods made it impracticable for the river span, the plan of erection must be one that involved no staging in the waterway; lastly, that while a continuous girder in three spans would fulfill all of these conditions during erection, yet the fact that the iron piers would rise and fall from the effects of temperature, while the cliff abutments would not, made it obligatory that the spans should be so hinged as to permit of this vertical motion of the piers without varying the strains in the truss. A careful investigation as to the proper point at which to hinge the girder showed that economy was best attained by cutting the lower chord of the end spans at one-fourth the span-length from the pier. From these considerations grew the plan finally adopted, the following description of which we quote from our former article:

"The viaduct as now constructed consists of three spans of 375 feet each, resting on the bluffs and on two iron piers, which latter in turn are supported by stone piers, each 120 feet long by 42 feet in width at the base. The iron piers consist of four legs each, and while having a base of 71 ft. 6 in. by 28 ft., their longitudinal profile terminates in a point at the top, or rather in a 12-inch pin upon which the truss rests as on a rocker. The entire pier is a complete structure within itself and can be rolled about on the masonry, the pedestals resting on double roller beds for this purpose.

"The truss itself is, during erection, a continuous girder of the Whipple type; but after erection it will be converted into

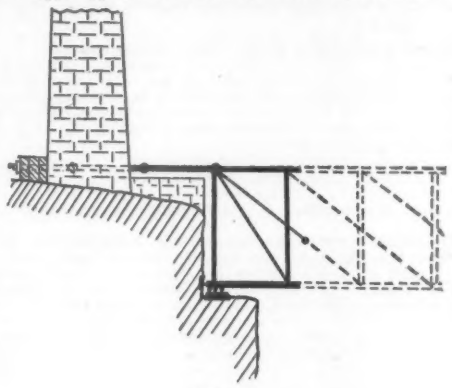


Fig. 1.

one continuous girder 525 ft. long, projecting at each end 75 ft. over its points of support, and carrying from each of these cantilevers a 300-feet span, which bridges the distance from the end of the cantilever to the bluff.

* * * * * * *

"The truss is 37.5 ft. deep and 18 ft. wide, and each bay is divided into 20 panels of 18.75 feet each. All connections between ties, posts and chords are hinged or pin connections, but the chords are riveted to each other throughout, with the novel addition that the pin carrying the tie bars is forced into the chord splice by hydraulic pressure, and thus does duty as a rivet. It will be seen that the details combine both the American principles of pin joints and of massing the materials in approved shapes along the lines of strain, together with the European practice of continuous riveted chords fitted to resist both tension and compression. This peculiar mode of construction was adopted in order to erect the truss in the manner which we are now about to describe.

After the bridge seat was cut out of the cliff, the end posts were set up and the first section of bottom chord laid in place, each chord being continued back to the rock by a large screw-jack placed between its rear end and the face of the bluff. Then the top of each end post was bolted back to Roebling's towers by anchor bolts, which had a screw adjustment. From this point the end or main tie was carried to the bottom chord at the foot of the second post, and then post No. 2 and the first panel of top chord were put in place. When the first panel was in position the work looked as shown

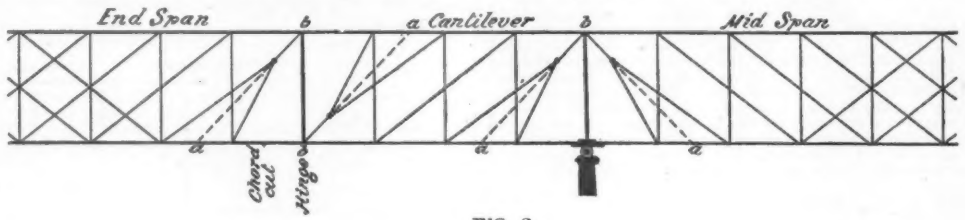


FIG. 2.

in fig. 1. It will readily be seen that with these connections once made the structure could be built out panel by panel until the limit of strength of the anchorage bolts or of the top chord or the available resistance of the Roebling towers had been reached. This last was the governing factor, and the other parts were proportioned to suit. Accordingly, as the truss grew out from the face of the bluff a temporary wooden tower sprang up from the bottom of the valley to meet it, the centre of the tower being 196 ft. 10 in. from the shore end of the span. When the truss was landed on the tower, the four truss posts resting on it were raised by large jack-screws until the anchor bolts were relieved of a previously determined portion of their strain, and when this point was reached the work of carrying out the span was again commenced.

"The next flight was to the permanent pier, 178 ft. 2 in. When the span left the bluff, the iron pier was started upward from the masonry, and the two met in mid-air, the working forces on each arriving at the point of junction within two hours of each other. The weather was cold, and the span was short, owing to the compression of the lower chord and the effect of temperature; but this had been foreseen, and the huge pier, weighing 40,000 lbs., was moved on its rollers toward the span until the pin which connects the two could be put in place. This done, the truss was built out as before until the middle of the river was reached, which completed the work from the north side. * * * * * In erecting this bridge the most important points for computation were: first, the angle to be given the span at starting so as to land properly on the wooden pier, and, next, the correct elevation to be given to the truss at the wooden tower so that an exact junction could be made with the pin on the top of the permanent iron pier. These operations were both successful."

The erection was carried on with little or no interruption during an exceedingly severe winter, the men working at times when the span and pier were covered with sleet and ice. The iron piers were raised without staging of any kind. After the completion of the masonry the derrick masts used on that part of the work were turned "end for end," and one stick placed at each corner of the pier as a gin pole. The necessary tackle was placed at the head of each pole and the fall line carried to a crab on shore, so that the men at the crab being out of danger from falling bodies would be inclined to act with more coolness in case of breakage. Each pole had an independent tackle for the purpose of giving it vertical motion, and as fast as each tier was raised the poles were moved upwards to the proper position for the next tier. These poles are seen in position in view No. 2 of the accompanying plates.

The machinery devised for raising both span and pier worked so perfectly that no drawback was encountered until the junction of the two halves of the bridge. At this stage of the work, the upper chords being almost entirely in tension and the lower chords in compression, the former were nearer to each other than the latter, and when the last sections were put in place the gaps were as follows:

Upper chord east, gap of	3	inches.	
" " west, "	2	"	
Lower chord east, "	1/4	"	
" " west, "	5	"	

The first operation was to close the gap of two inches in the west upper chord, which was readily effected by the use of the screw jacks at the shore ends of the bridge and by moving the piers towards each other. This left a gap of 1½ in. between the ends of the east top chord. At midday, therefore, with the thermometer standing at 70° in the sun, all the horizontal laterals tending to draw these ends together were screwed up taut and the counter-laterals were slackened. The contraction of the lateral rods closed the gap at daybreak on the following morning—temperature 40°. The top-chord connections were now riveted up, leaving the gaps in the lower chords respectively one and two inches. The contraction due to temperature had by 4 o'clock next morning withdrawn the shore ends of the lower chords three-quarters of an inch from the jacks. These were screwed out so as to take up this space, and by midday the chord had expanded until the gap in the east chord was closed and the connection was made. This operation was repeated for the west chord, and in twenty-four hours later the junction was made and the girder completed from shore to shore.

The final operation consisted in cutting the lower chord at the previously selected points in the shore spans so as to hinge the girder. Tenonjoints had been made in the lower chord at these points, in which temporary rivets had been driven. These were now driven out one by one until the connection was severed and the end spans hung free. The mean motion of the severed joint after cutting was only $\frac{5}{16}$ of an inch, and the change in the profile of the bridge was barely perceptible. This proved the accuracy of the method used for determining the proper point for cutting. In this the theory of the elastic line was ignored entirely, and the truss was dealt with panel by panel and member by member, chords, posts and ties—until the point of contraflexure was reached.

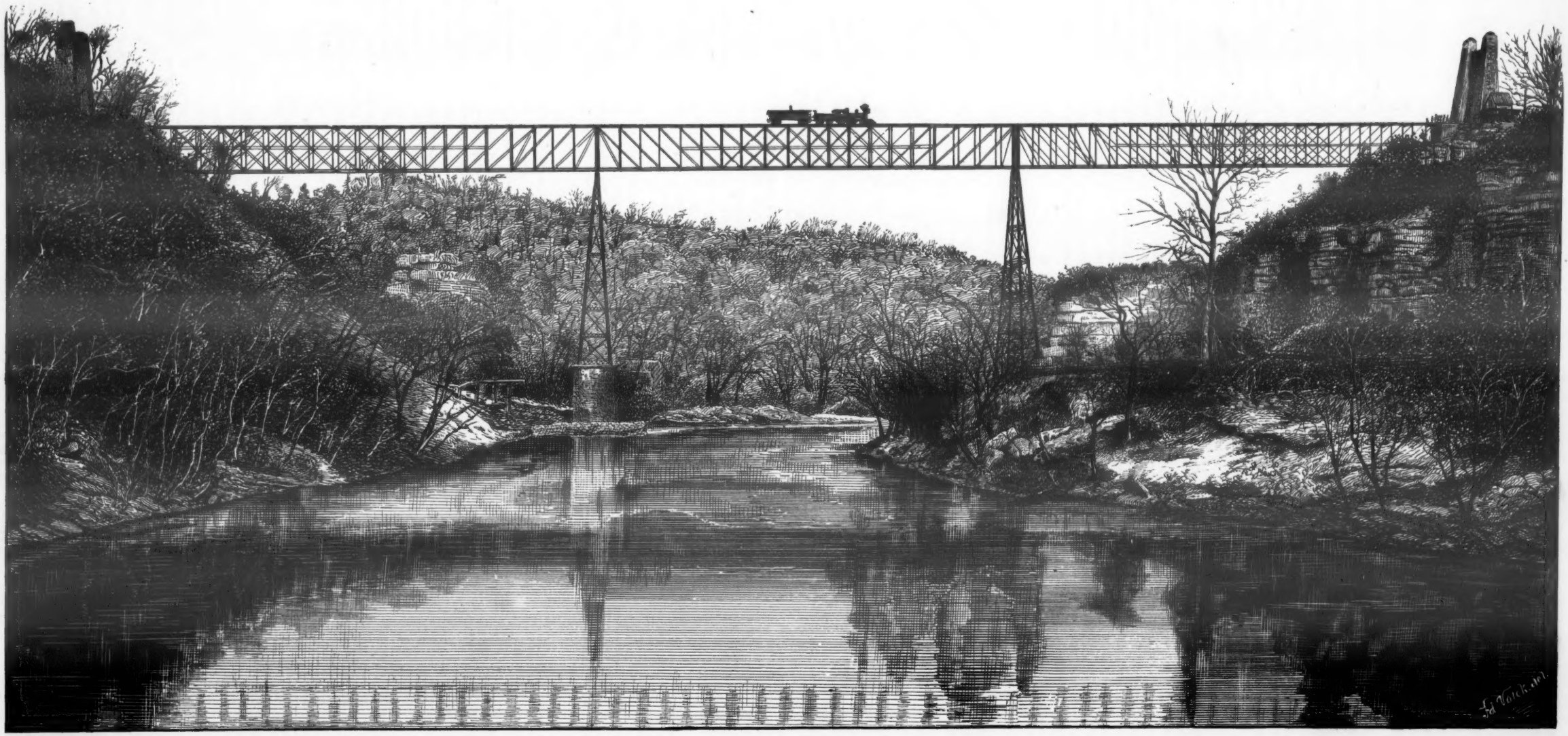
For the information of those gentlemen who in these columns and in the pages of *Van Nostrand's* heve so vigorously discussed the properties of continuous girders and the modulus of elasticity, we will here state that in this bridge the greatest efforts were made to secure a uniform modulus. Iron mixtures were prescribed in the puddling furnace and in the rolling mill pile. Every plate was tested at the mill and all bars paired together by their moduli, while the workmanship was very exact. Despite all this, the moduli varied from 20,400,000 to 28,200,000 lbs. and during erection, the two trusses began to vary in height at three panels from the starting point, which variation exceeded one inch at several places. As has just been stated, the variation in length, arising mostly from this cause, between the east and west chords amounted to one inch in 1,125 ft.

The erection was commenced on the 16th of October and completed Feb. 20, four months and four days. At no time did the force exceed 60 men, and the average number was about 53 on duty.

The official test was made April 20 with a train having four engines in the middle and iron cars at either end loaded to 40,000 lbs. each. The equivalent uniform load was 2,073 lbs. per foot on the 300 ft. spans, and 1,977 lbs. per foot on the 375 ft. spans. The deflections were as follows:

Both end spans loaded.	Inches
Greatest deflection of 300 ft. span	1.518
" " " cantilever point	1.944
" depression of pier	0.372
Upward deflection of mid span	2.832
Mid span loaded—Ends unloaded.	
Greatest deflection of mid span	3.498
Upward motion at cantilever point	1.580

As the longitudinal stability of the truss is derived from the piers, the last trial was for the purpose of testing this



KENTUCKY RIVER BRIDGE, ON THE LINE OF THE CINCINNATI SOUTHERN RAILWAY.

Designed and erected by the Baltimore Bridge Company, C. SHALER SMITH, Engineer.

Iron work fabricated by the Edgemoor Iron Company, of Wilmington, Delaware.

THOMAS D. LOVETT and G. BOUSCAREN, } Engineers, Cincinnati Southern Railway.

DIMENSIONS AND QUANTITIES:

Length between abutments	1138.00 feet	Height of rail above river bed	279.50 feet	Stone pier at base	1.20x42.0 feet	Iron in piers	798,901 lbs.
Length of each span	375.00 "	Height of rail above pier base	286.10 "	Iron pier at base	71.5x28.0 "	Cubic yards of masonry	12,935
Depth of truss	37.50 "	Total height of iron work	214.75 "	Iron pier at top	18.0x 1.0 "	Cubic yards of foundation excavation,	14,665
Width of truss	18.00 "	Total height of masonry	71.25 "	Iron in spans	2,855,379 lbs.	Flood rise of river	57 feet.
Height of rail above low water	275.50 "						

stability. An engine drawing 24 cars, loaded with railroad iron, was moved on the bridge at a speed of 26 miles per hour. There was a brakeman on each car, and at a given signal the engine was reversed and the brakes applied, the train being brought to rest in 104 feet. The extreme motion of the pier heads caused by this test was only one-half inch.

One of the peculiarities of this structure is that the piers and span are pinned together, no provision whatever being made for expansion and contraction. In proportioning the piers, however, they were considered to be vertical only at 60° temperature. At 150° each pier will be bent outwards, and when in this condition it was assumed that a train weighing 1,125 tons would come to rest on it from a high speed, with the brakes all down and the wheels sliding. The extra strains from temperature and moving train having been determined, the necessary sections to meet them were added to the normal sections of the pier. One other fact revealed by the test is too significant to be passed without notice. To avoid ambiguity in the strains at the hinging points, both of the web systems are consolidated into one member at the point of contraflexure and separated again after the hinge is passed. See fig. 2.

During the trials it was found that the longitudinal motion of the tenon where the lower chord was cut was 1½ inch. This is suggestive when applied to the consideration of the character of the strains in the web system of a continuous girder at the point of contraflexure.

The enormous proportions of this great viaduct can best be appreciated from the following table of dimensions and quantities :

Length between abutments	1,138.00 ft.
" of each span	375.00 "
Depth of truss	37.50 "
Width " "	18.00 "
Height of rail above low water	275.50 "
" " " " river bed	279.50 "
" " " " pier base	286.10 "
Total height of iron work	214.75 "
" " " " masonry	71.25 "
Stone pier at base	120×42 "
Iron " " "	71.5×28 "
Iron " " top	18.0× 1.0 "
Iron in spans	2,855,379 lbs.
" " piers	798,901 "
Cubic yards of masonry	12,635 "
" " " foundation excavation	14,665 "
Flood rise of river	57 ft.

The iron work of this bridge was manufactured by the Edgemoor Iron Company, of Wilmington, Del., and is said by those who have had abundant opportunity to know to be superior to that of any other iron bridge in the country. The parts, it is said, went together like a springfield musket.

The whole work was carried out very successfully, and reflects great credit upon the engineer, Mr. C. Shaler Smith, who designed the work, and the Baltimore Bridge Company, which executed it.

Movement of the Cotton Crop of 1876.

The cotton year ends with August. About that time nearly all the old crop has been harvested, while the picking of the new crop has begun. Statistics of production, movement and consumption are kept more completely for cotton than for any other crop, probably, this being made practicable from the fact that there is very little domestic or household consumption, while the largest part of the crop is marketed at markets of considerable importance.

Very full reports of the crop are given in the *Commercial and Financial Chronicle*, the leading authority on this subject, which, in its issue of Sept. 15, reviews the movement of the crop of 1876. It is from this that we obtain the data for what we have to say below.

Cotton, though the great staple of a very large part of the country, can hardly be said to afford a large amount of freight. An average crop of corn on eight or ten acres in Illinois or Iowa yields a car-load; but it would be a very satisfactory crop of cotton which would give the same weight from 100 acres of a Georgia plantation. The entire cotton crop of 1876 would make about 105,000 car-loads, which is about equal to the weight of corn marketed at Chicago alone, and is probably not one-third as great as the total corn crop of a single State.

However, cotton is not to be compared by weight alone with any other crop of the country even as an article of freight. It is distinguished from all other staples of the country by the fact that nearly every bale of it is shipped, by far the largest part of it for several hundred miles, and about two-thirds of it for some thousands of miles.

It is nearly two thousand miles from the western part of the cotton-producing country to the centre of domestic cotton manufacture, and some 800 miles from the eastern part. There is thus an opportunity for a "long haul" on most of the cotton traffic.

But, though the cotton fields are everywhere distant from the great cotton mills, they are yet so situated that the distance is a comparatively slight obstacle to the free movement of the staple. Whether marketed at Charleston or Galveston, at Memphis or Montgomery, it can always be sure of transportation at low rates to Eastern manufacturing or exporting cities.

This is largely due to the position of the cotton country. It is really a not very wide belt of country stretching along the Atlantic and Gulf coast. Nowhere is it distant from the sea. By far the larger part of the crop is raised within 300 miles of tide-water. Thus if the inland routes do not offer cheap transportation to the Northeast, the cotton can always be taken by a comparatively short route southward or eastward to the sea, which always affords cheap transportation to either the American or the European manufacturing centres. Thus, though cotton is a material which is so indispensable and so valuable in proportion to its weight that it would be moved even at high rates, the fact is that it is carried over long rail routes in this country at very low rates, and doubtless always must be, whether the railroad companies combine or not.

To Southern railroads the bulk of the cotton crop is less important than its value. The prosperity of their patrons depends upon it, and most of their traffic increases or decreases with the returns made by the cotton crop. A very large crop with very low prices may be less favorable to them than a quite moderate crop with high prices, as it is not chiefly from the carriage of the cotton that they must make their profits.

The crop of 1876 has turned out to be unexpectedly large —much larger than was estimated when the picking began a year ago. The crop of 1875 had never been equaled, except in 1859. It amounted to 4,669,288 bales, with an aggregate weight of 2,201,410,024 lbs. When this result was ascertained it was estimated that the crop of 1876 would yield about 4,000,000 bales. Instead of this, the total reported by the *Chronicle* is 4,485,423 bales, weighing 2,100,465,086 lbs., or only 4.6 per cent. less than the great crop of 1875, and more than any other crop since 1859. Cotton is a somewhat precarious crop, suffering more from rains and drouths at unseasonable times, and from the attacks of insects, than most other field crops, so that it is not possible to judge from the bulk of two or three crops whether the cultivation is extending or not. But judging from the returns for a series of years it would appear that it is extending, though not rapidly.

The average production of the five years before the war was 3,646,148 bales per year; of the five years following the war, 2,480,348 bales; of the next five years (ending with 1874), 3,832,569 bales; and for the past five years (1872 to 1876, including three years of the last period mentioned) the average production has been 4,217,720 bales. This shows a progressive increase since the war; but it is still true that the crop of 1870 was nearly as large as that of 1876. As to the period of five years following the war, it was not to be expected that there would be anything like full production then, the cotton country being then stripped of capital and with its labor in a most disorganized and inefficient condition.

Although the increase in production of late years has not been very rapid, there have doubtless been considerable changes. The new country of the South, answering to the prairies of Minnesota, Western Iowa, Western Missouri, Kansas and Nebraska in the North, is in Texas, and here there has been a great extension in the area cultivated and the quantity produced, very likely exceeding the total increase from the whole country, as in some of the older States there appears to be greater attention paid to food crops and some diminution of the area planted with cotton.

The reports do not give the production of different states, which it is not possible to ascertain with anything like accuracy, but cover the cotton at the places where it is marketed.

There was an increase of receipts in 1876–77, as compared with the previous year, only at North Carolina, South Carolina, Florida and Texas ports, and at Boston. The number of bales and the percentage of the total crop received at the ports of the several states for the two years have been :

	1876–77.		1875–76.	
	Bales.	P. c. of crop.	Bales.	P. c. of crop.
Louisiana	1,195,035	26.7	1,415,959	30.3
Alabama	360,918	8.0	374,672	8.0
South Carolina	468,024	10.4	416,372	8.9
Georgia	491,800	10.9	524,825	11.2
Texas	506,634	11.3	488,640	10.5
Florida	23,089	0.5	17,434	0.4
North Carolina	138,037	3.1	107,836	2.3
Virginia	575,941	12.9	529,126	11.4
New York	121,213	2.7	198,693	4.3
Boston	100,206	2.2	71,396	1.5
Philadelphia	45,218	1.0	36,826	0.8
Baltimore	7,871	0.2	6,297	0.1
Portland	4,105	0.1	3,066	0.1
	4,038,141	90.9	4,191,142	89.8
Shipped direct to mills	300,282	6.7	333,146	7.1
Manufactured South	147,000	3.3	145,000	3.1
Total crop	4,485,423	100.0	4,669,288	100.0

In the above statement, receipts are not counted which were received at one port from another port, so that the amounts do not at all represent the total cotton business of the different ports, but only the supplies received at each directly from the interior.

Although names of States instead of ports are given, still the distribution at different ports is shown pretty accurately, as no State has more than one important cotton port. For instance, the Louisiana receipts are exclusively New Orleans receipts, the Alabama receipts Mobile receipts, 98 per cent. of the Texas receipts Galveston receipts, 96½ per cent. of the Georgia receipts Savannah receipts, 93 per cent. of the South Carolina receipts Charleston receipts.

Of the total crop, 3,049,497 bales were exported last year, against 3,252,994 the year previous. The quantity manufactured in this country, however, increased from 1,356,598 bales in 1875–76 to 1,435,418 in 1876–77, or nearly 6 per cent. Indeed, there has been scarcely any interruption to the increase in domestic consumption, notwithstanding the dullness of the times and the troubles of manufacturers, and last year the amount required for this purpose was more than 30 per cent. greater than in 1872 and greater than in any other year.

The distribution of exports is interesting as an indication of the probable inland transportation of the product of different parts of the country. It would be natural to suppose that the South Atlantic States would have an advantage in supplying the mills of the Eastern States, and that the Gulf States, at least those which have convenient outlets at New Orleans and Galveston, would ship to Europe rather than to New England. In fact, we find that 76 per cent. of the Galveston and New Orleans receipts were exported, and but 46 per cent. of the total receipts of the Atlantic ports south of Baltimore. The three Gulf ports, Mobile, New Orleans and Galveston, exported 55 per cent. of the total exports of the country last year and 56½ the year before ; the South Atlantic cities altogether exported but 26 per cent. last year and 24½ the year before.

New York is the only one of the Northern cities which makes much of a figure as a cotton exporter. It is credited with about one-seventh of the total exports last year, and with 15½ per cent. the previous year. The changes in potion of the different leading exporting cities are shown by the following statement of the percentage of the total exports shipped from each for six years past :

	Year ending Aug. 31.					
	1872.	1873.	1874.	1875.	1876.	1877.
New Orleans	45.4	44.0	40.4	37.3	42.0	39.5
New York	19.0	21.4	17.1	16.6	15.3	14.2
Savannah	15.1	14.0	15.1	15.4	11.4	9.8
Charleston	5.7	6.0	8.7	10.2	8.7	11.1
Galveston	5.9	7.8	9.7	8.3	7.3	8.5
Mobile	7.0	5.0	4.7	4.9	7.5	7.2
Norfolk	0.2	0.3	0.7	2.5	3.3	4.0
Boston	0.7	0.4	0.9	1.4	1.8	2.5
Baltimore	0.7	0.7	1.5	1.7	0.9	1.0

It appears thus that the cotton trade of New York tends to decrease, while at Mobile, Norfolk and Boston the tendency is to increase. Galveston remains almost stationary, in spite of the great increase of production in Texas, as it has recently had to meet the competition of the railroads which take the cotton northward (chiefly to St. Louis). This St. Louis business has been wholly developed within a very few years, and the shipments thence last year amounted to 212,651 bales, nearly all coming from Texas and Arkansas. This makes it next to Memphis the largest interior cotton market in the United States; its receipts are now nearly half as great as Galveston's.

The reports do not show any increase in the movement from inland markets, but the contrary instead. Last year 6.7 per cent. of the crop was so disposed of, against 7.1 the year previous. This does not prove, however, that long hauls by rail are decreasing. Probably they are not, though the figures now at hand are not sufficient to show the tendency. But we know that now large quantities of cotton are brought to Savannah, Charleston, Wilmington and Norfolk from stations far to the west, while nearly the entire amount handled at St. Louis is sent finally to the East, and is manufactured after a journey of nearly 2,000 miles by rail. Moreover, about one-fourth of the Memphis receipts were shipped last year to Norfolk and other northern ports, which is as much as went thence to New Orleans.

Putting together the original receipts at ports north of the Potomac and the shipments directly to manufacturers, all of which must have been carried a long distance by rail, it appears that about one-eighth of the crop was so moved.

As for the prospects of the new crop, it seems to be believed that it will be a good one, but we see no estimates of the amount as yet. It is said, however, that the South is now more generally out of debt than ever before since the war, and has grown a larger proportion than before of its food and forage crops, so that a year of unusual prosperity is anticipated, notwithstanding low prices.

The New York Court of Appeals and the Elevated Railroads.

The companies which have undertaken to supply the city of New York with fast passenger roads have had their way obstructed almost constantly by legal obstacles, the owners of property on the lines calling in question the legality of the enterprise when they thought that they would suffer by it. This has been very harassing to the companies, and provoking to a very large part of the community, for those who would profit greatly by the use of the roads are not likely to consider very carefully or patiently the claims of those whose property might be damaged. This is the common fate of public enterprises which are new in character, especially when they are constructed in cities, where they affect to some degree very valuable buildings and lands held by a large number of owners. It is impossible to negotiate with so many owners. Some are sure to fight to the end any scheme which affects them ever so little. The New York Elevated Railroad, which succeeded in getting a single track and several long sidings through from the Battery to Central Park, has been prevented from completing a second track by legal proceedings, and also from making a be-

ginning of its proposed east-side line; and the Gilbert Elevated was stopped when a fair beginning was made with the erection of its structure.

The court of last resort has now brought in decisions in favor of these companies, declaring that they are legal organizations, with proper authority to build the structures they had undertaken on the routes where their work was interrupted. As we understand it, there is now no obstacle which can prevent the completion of both roads as proposed, though one very important question which may have an immense effect on the cost of the roads remains undecided.

For the Court, while it decides that the c mpanies may build their roads in the streets as proposed, does not decide whether they will be liable to the owners for any damage caused by the construction of the roads to the property adjacent. The Court says expressly: "The question of damages is not involved in these cases. To determine what particular occupation of the streets is to be deemed a legitimate public use involves important and delicate questions. Whether the structure contemplated to be built and operated will be an invasion of the property of the building-owners in any of the streets, entitling them to some remedy for damages, or whether it will be regarded as a legitimate use of the streets for the benefit of the public, the inconvenience and annoyance of which private abutting ownership is subject to, cannot with propriety be adjudicated upon these appeals." Thus there will have to oe at least one more decision before it can be known whether the companies will have to pay damages for their use of the street, and if so what shall be the measure of those damages. In the case of the Gilbert Company, the appeals were from orders appointing Commissioners to appraise damages for the occupation of a part of a street the fee of which was in the owners of the abutting lands, and not in the city. These Commissioners will now have to be appointed, and probably this peculiar case will be decided shortly. But as for most of the distance on both roads the fee of the street is in the city, and the land-owners can only claim damages for the operation of the road in front of their property, which, if allowed, will vary very greatly with the character of the property, this will not end the matter.

Generally, we may say, the decision of the Court of Appeals leaves the companies free to complete their roads, but also leaves it uncertain how much it will cost them to do so, and whether they will not have to pay as much for damages as for their structure. If they will take the risks and give bonds in each case, doubtless they can proceed now with little or no interruption from legal processes.

Strength of a Bar of Iron after being in Use over Twenty-Five Years.

Maj. E. T. D. Myers, General Superintendent of the Richmond, Fredericksburg & Potomac Railroad, has sent us a report of the tests of a bar of iron which, he writes, "had done duty for more than a quarter of a century in a railroad bridge in this State. It has not crystallized in that service, although strained very frequently in every twenty-four hours with loads of more than 20,000 lbs. per square inch, and not infrequently with those equal to if not slightly in excess of the elastic limit as now ascertained by experiment."

A piece of this rod, 2 ft. long and 1¾ in. diameter, was tested by Col. D. W. Flagler, under the following conditions and with the results stated:

The diameter of the sample was 1.13 in., which we infer means that the piece of bar was turned town to that size. The area of cross section was 1.0028 in. and the length between shoulders 10 in. This sample was subjected to a tensile strain of 1,000 lbs., or 997.2 lbs. per square inch of section. This was then taken off and increased 1,000 lbs., and this was repeated until the bar finally broke, the load being increased each time 1,000 lbs. To quote the language of Col. Flagler: "Each time after the load was put on the bar the *extension* was measured and the load was then taken off and the *restoration* was measured." The test piece did not take any permanent set until it had been strained twenty-eight times with a load of that many thousand pounds, or 27,923.6 lbs. per square in. Up to 36,000 lbs. "the permanent set was almost inappreciable." With a load of 39,000 lbs., or 38,891.4 lbs. per square inch, the iron began to fail rapidly. At a strain of 54,250 lbs. per square inch of original section it broke, having stretched 2.44 in., the diameter of fracture being 0.893 square inches, so that the strain per square inch of fractured area was 60,750 lbs. To quote from Mr. Flagler's comments: "The bar was pulled 54 times and the *wear* of the iron caused by these repeated pulls reduced its ultimute tenacity (54,200 lbs.) below that obtained from another piece of the bar which was tested for tenacity only, and which broke at a strain of 56,820 lbs. The tests show a remarkably elastic and excellent iron. Permanent set in good iron usually begins at a load of from 20.000 lbs. to 24,000 lbs. per square inch."

The piece tested for tensile strength alone was 1.415 in. diameter, with an area of 1.5725 square inches; length between shoulders, 6 in. The total breaking weight of this was 89,450 lbs., or 56,820 lbs. per square inch of original section. In commenting on this Colonel Flagler says:

"This specimen was taken from the end of a bar of 1⅝ in. diameter round iron. The specimen had a screw thread cut on nearly its whole length, and had a nut on it. It was tested as nearly as possible in the same condition in which it had been used. The cutting of the screw thread reduced the bar to the diameter given above, viz., 1.415 in. The specimen was prepared for testing by turning down the nut to make it fit the clamps of the machine, and the pull at one end of the specimen was on the nut itself. The strain or pull was therefore precisely what the rod had been subjected to when used in the bridge, and gives the total strength of the rod, namely, 89,450 lbs.

"The other end of the specimen was prepared for the machine by heating and upsetting, or staving up, the end to form a head for the clamps to take hold of. In doing this, care was taken to avoid injuring or changing the character of the iron in the weaker part of the bar—under the screw thread—where it was to be broken. I do not think the iron at this part was injured by the heating.

"Reducing the diameter of the bar by cutting the thread on it, as it was used in the bridge, reduced its strength from a probable strength of 117,900 lbs. to 89,450 lbs.

"The tests show a remarkably excellent iron, both for tenacity and endurance."

Record of New Railroad Construction.

This number of the *Railroad Gazette* has information of the laying of track on new railroads as follows:

Foxburg, St. Petersburg & Clarion.—The first track is laid from Foxburg, Pa., northeast to St. Petersburg, 4 miles. It is of 3 ft. gauge.

Suffolk & Albemarle.—Track has been for some time laid on this road from Suffolk, Va., south by west to Somerton, 10 miles. It is of 3 ft. 6 in. gauge.

Toledo & South Haven.—The first track is laid from Paw Paw, Mich., west to Lawrence, 8 miles. It is of 3 ft. gauge.

Minneapolis & St. Louis.—Extended from Waterville, Minn., south to Waseca, 8 miles.

Burlington, Cedar Rapids & Northern.—Extended from Northwood Ia., north by west to Albert Lea, Minn., 17 miles.

This is a total of 47 miles of new railroad, making 1,223 miles completed in the United States in 1877, against 1,556 reported for the corresponding period in 1876, 746 in 1875, 1,025 in 1874, 2,507 in 1873, and 4,623 in 1872.

THE EMPIRE TRANSPORTATION COMPANY, one of the oldest and most skillfully managed of the stock company fast freight lines (of which few of much importance remain), will, it is reported, be bought up by the Pennsylvania Railroad Company, over whose lines it works chiefly (but not entirely). This will give the Pennsylvania Railroad Company direct and full control of nearly all the freight business carried over its lines, the Union Transportation Company, which was the largest of the fast freight lines working over this road, having been absorbed a a few years ago. Now, with but few important exceptions, the fast freight lines of the country are owned solely by the railroads over which they run: that is, they are co-operative enterprises, without capital, their cars being supplied by the roads over which they run, their expenses divided among the different companies which own the cars, while they have properly no earnings, each railroad receiving the portion of the freight due it, whether earned in a line car or in any other.

THE 5 FT. 6 IN. GAUGE, which at one time had a considerable mileage in the United States, occupying the two extremes of the railroad system—Maine and Texas—with the recent change of the European & North American and its connections now disappears almost entirely, the only line of that gauge which we can recall being the Vicksburg, Shreveport & Texas in Louisiana, and that would doubtless be changed if it had any money to do the work or any connections to make it desirable. The Maine Central gave up the wide gauge several years ago, and the Texas roads have gradually abandoned it, the last of them changing but a few months ago. The railroads of Canada, where the 5 ft. 6 in. was at first the standard gauge, have also changed to 4 ft. 8½ in.; and for some years past the European & North American has stood alone, embarrassed in its traffic by the break at each end of its line, but held back by its financial troubles from making the change.

THE CANAL TONNAGE during the month of August last amounted to a total of 736,110 tons, against 590,063 last year, showing an increase of 24¾ per cent., and for the season down to the end of August this year's movement has been 13½ per cent. more than last year. The gain in grain in August is equal to six-sevenths of the total gain, and the only other large gain is in lumber. There were large decreases in iron ore and iron, stone and lime, and bituminous coal.

NEW PUBLICATIONS.

A Treatise on Engineering Construction: embracing discussions of the principles involved and descriptions of the material employed in Tunneling, Bridging, Canal and Road Building, etc., etc. By J. E. Shields, C. E. New York, D. Van Nostrand.

This book appears under a false title. It consists of a miscellaneous collection of ill-arranged notes on various subjects, and is no more a treatise on engineering than a dish of hash could be called a complete dinner. It begins with a number of notes on foundations, which are very good and contain many useful hints on a subject which is seldom discussed much in the books, or, if it is, in such a general way as to be of very little practical use. After foundations there are disjointed notes on masonry, arches, retaining walls, more masonry, tunnels—very brief and fragmentary—structural character of stones, cements and mortars, a short note on timber, then engineering, grading, leveling, a number of loose notes on railroad curves without system or completeness, geometrical problems, and then some more notes on the construction of masonry. The book has 138 pages which look as if the author had given his memoranda to a compositor with instructions to make a book out of them. It is not a treatise in the sense in which that word is ordinarily used, and it must be a cause of surprise that the publisher should issue such a book with such a title.

A Treatise on the Use of Belting for the Transmission of Power: By John H. Cooper, Mechanical Engineer. Philadelphia: Claxton, Remsen & Haffelfinger. London: E. & F. N. Spon. 8vo., pp. xvi., 310,

This work contains nine chapters, treating respectively of "Rules and Data for Belting," "Methods of Belt Transmission," "Cements, Adhesives and Fastening," "Varieties of Belting," "Strength of Belt Leather," "Experiments of Briggs and Towne on Leather Belts," "Experiments on the Tension of Belts, by A. Morin," "Rope Transmission of Power" and "Frictional Gearing." The "Rules and Data" are a collection furnished by various engineers, varying in the most irregular manner, and generally only suitable to serve as frightful examples of how not to do it. As most of these rules are flatly contradicted by those deduced from the experiments of Briggs, Towne and Morin, detailed in subsequent chapters, in which the proper theory of belt transmission is introduced, the wisdom of giving detailed accounts of antiquated and incorrect practice is not very apparent. Nearly half the book is filled with these examples and rules, generally in full detail as furnished by their authors. They could readily have been condensed to a few pages by changing all the rules to the same general form, and determining the constants used in each. They would thus have appeared to greater advantage—for the reader—as their discrepancies would have been so apparent as to show him that they were generally worthless.

The last four chapters are by far the most valuable, but there is much useful information in periodical literature that might have been added to the chapter on rope transmission.

A compilation of this kind will be very interesting to many readers, but there are at least two points that detract from its practical value. In the first place, it is by no means a complete compilation, several important points, among which may be noted the proportions of cone pulleys and the length of belts, being comparatively neglected. A more important defect is, that the work is only a compilation—and as far as can be judged from the arrangement, it might be fair to conclude that one rule or method is just as good as another. In this respect, the influence of the book can hardly be for good, since it is calculated to mislead an inexperienced reader. Such a result, however, is almost a necessary consequence of publishing the compilation that is made for a book, instead of writing a book on the basis of the compilation.

General Railroad News.

ELECTIONS AND APPOINTMENTS.

Pittsburgh, New Castle & Lake Erie.—Hon. H. R. Low, late of Middletown, N. Y., has been chosen President, in place of Delos E. Culver, resigned. Mr. Culver has been appointed Consulting Engineer.

Railroad Traveling, Passenger & Advertising Agents' Association.—At the annual convention in Chicago, Sept. 12, the following officers were chosen: President, J. A. S. Reed, Hannibal & St. Joseph; Vice-Presidents, L. B. Church, Lake Shore & Michigan Southern; Adrian Atkins, Illinois Central; Lyman McCarthy, St. Louis, Kansas City & Northern; James Simmons, Pennsylvania, and Joseph Simpson, Missouri, Kansas & Texas; Secretary, W. P. Cooley, Union Pacific; Assistant Secretaries, C. P. Kennedy, Ohio & Mississippi, and H. J. Vail, Erie.

Brotherhood of Locomotive Firemen.—At the annual convention in Indianapolis, Sept. 15, the following officers were chosen: Grand Master, F. B. Allen, Louisville; Vice Grand Master, W. T. Gundie, Philadelphia; Grand Secretary and Treasurer, W. N. Sayre, Indianapolis; Grand Warden, John Savage, Lynn, Mass.; Grand Conductor, Charles Pope, Toronto, Ont.; Grand Inner Guard, C. G. Swan, Buffalo, N. Y.; Grand Outer Guard, W. Cowles, Camden, N. J.; Grand Chaplain, M. Barphy, Indianapolis; Grand Marshal, E. V. Debs, Terre Haute, Ind.

Boston & New York Air Line.—Mr. Pulaski Ladd has been appointed Master Mechanic, in place of Wm. Lowell, resigned. Mr. Ladd has been for a long time an engineer on the New York, New Haven & Hartford road.

Indianapolis, Bloomington & Western.—The following officers have been elected for the ensuing year: President, Benjamin E. Smith; Vice-President C. R. Griggs; Secretary and Treasurer, A. P. Lewis.

Indianapolis, Delphos & Chicago.—At the annual meeting recently the following directors were chosen: Enoch Rinehart, James Odell, J. F. Richardson, V. Holt, J. B. Pollard, Charles Angell, Rowland Hughes, S. B. Bushnell, R. W. Price, A. McCoy, John Lee, H. Y. Morrison, W. S. Haymond. The board elected John Lee President.

Chicago & Evanston.—At the annual meeting in Chicago last week the following directors were chosen: Wm. H. Bradley, W. C. Goudy, J. Russell Jones, George Rumsey, Julian Rumsey, H. A. Towner, V. C. Turner.

Bennington & Rutland.—The complete list of officers of this road (the northern section of the Harlem Extension) is as follows: General Manager, Trenor W. Park; Superintendent, F. C. White, Rutland, Vt.; General Freight and Passenger Agent, George A. Sanderson, Rutland, Vt.; General Accountant, W. G. Shaw, North Bennington, Vt.; Master Mechanic, George W. Blanchard, Bennington, Vt.

Portland, Salt Lake & South Pass.—At a meeting held in Portland, Oregon, Sept. 5, the following directors were chosen: G. H. Woodard, J. M. Strowbridge, C. M. Wiberg, A. J. Dufur, E. J. Jeffery, J. C. Hawthorne, C. P. Church, W. W. Chapman. Subsequently the board elected J. C. Hawthorne President; W. W. Chapman, Vice-President; C. H. Woodard, Secretary.

St. Paul & Duluth.—Mr. E. Q. Sewall has been chosen Secretary and Treasurer, in place of Thomas M. Davis, deceased. His appointment dates from Sept. 10.

Anderson & Augusta.—This company was organized at a meeting held in Lowndesville, S. C., Sept. 8, by the election of the following: President, J. M. Latimer; directors, J. S. Murray, E. M. Rucker, B. F. Whitner, J. N. Brown, J. H. Reed, J. W. Norris, J. T. Barnes, R. T. Beckham, T. Baker, W. M. Taggart, J. T. Baskin, W. D. Mars, A. T. Wideman, S. R. Morrah, G. Cade, W. K. Bradley.

PERSONAL.

—Mr. George A. Bates, Assistant General Manager of the Cambria Iron Works, died at Johnstown, Pa., Sept. 7, of inflammation of the lungs. He was 40 years old, was born in North Brookfield, Mass., and was a son-in-law of Hon. Daniel J. Morrell, General Manager of the Cambria Iron Works.

—Mr. Wm. Lowell, recently appointed Master Mechanic of the Boston & New York Air Line, resigned the position after holding it only a few days.

—Mr. A. P. Gorman, President of the Chesapeake & Ohio Canal Company, is a prominent candidate for United States Senator from Maryland.

—Mr. Thomas M. Davis, Secretary and Treasurer of the St. Paul & Duluth Railroad Company, died Sept. 2.

—The Port Jervis *Gazette* says: "Paymaster Swan, of the Delaware Division of the Erie Railway, has resigned his posi-

tion, to take effect on the 1st of October. He takes a better position as superintendent of a large manufacturing establishment in New York city."

—Mr. Howard Fry, Superintendent of Motive Power of the Philadelphia & Erie Division, Pennsylvania Railroad, is reported as slightly injured by a collision between two trains on the road, near Williamsport.

TRAFFIC AND EARNINGS.

Railroad Earnings.

Earnings for various periods are reported as follows:

Year ending June 30:

	1876-77.	1875-76.	Inc. or Dec.	P. c.
Louisville, Cincinnati & Lexington..	$1,049,369	$1,011,688	Inc.. $37,681	3.7
Expenses	752,019	734,798	Inc.. 17,221	2.3
Net earnings	$297,350	$276,890	Inc.. $20,460	7.4
Earnings per mile.	4,602	4,437	Inc.. 165	3.7
Per cent. of exp'ses.	71.66	72.63	Dec.. 0.97	1.3
Nashville, Chatta. & St. Louis	1,632,277	1,751,600	Dec.. 119,323	6.8
Expenses	928,761	996,270	Dec.. 67,509	6.8
Net earnings	$703,516	$755,330	Dec.. $51,814	6.9
Earnings per mile..	4,787	5,137	Dec.. 350	6.8
Per cent. of exps...	56.90	56.88	Inc.. 0.02	....

Eight months ending Aug. 31:

	1877.	1876.		
Central Pacific	$10,615,572	$11,264,320	Dec.. $648,748	5.8
Cleveland, Mt. Vernon & Delaware	242,658	244,291	Dec.. 1,633	0.7
Denver & Rio Grande.	464,221	288,421	Inc.. 175,800	61.0
Great Western, of Canada	2,423,352	2,601,872	Dec.. 178,520	6.9
Grand Trunk	5,862,429	6,226,101	Dec.. 363,672	5.8
Ind., Bloom. & West'n	792,758	996,313	Dec.. 203,555	24.3
Louisville & Nashville	3,409,578	3,175,808	Inc.. 233,770	7.5
St. Louis & Southeastern	691,672	686,767	Inc.. 4,905	0.7

Seven months ending July 31:

Bur., Cedar Rapids & Northern	$501,958	$662,483	Dec.. $162,525	24.5
Net earnings	99,254	156,032	Dec.. 56,778	37.1
Per cent. of exps...	80.22	76.45	Inc.. 3.77	4.9
Cleve., Mt. Vernon & Delaware	208,669	211,290	Dec.. 2,621	1.2
Net earnings	36,481	33,812	Inc.. 2,669	7.9
Per cent. of exps...	82.50	84.00	Dec.. 1.50	1.8
Kansas Pacific	1,620,407	1,598,079	Inc.. 22,328	1.4
Net earnings	641,588	594,825	Inc.. 46,763	7.9
Per cent. of exps...	60.42	62.78	Dec.. 2.36	3.8
Nashville, Chatta. & St. Louis	942,639	1,004,031	Dec.. 61,392	6.1
Net earnings	361,664	373,400	Dec.. 11,736	3 1
Per cent. of exps...	61.64	62.81	Dec.. 1.17	1.9
St. Louis, Iron Mt. & Southern	2,209,461	1,976,973	Inc.. 232,488	11.8
Net earnings	923,728	736,948	Inc.. 186,780	25.3
Per cent. of exps...	58.18	62.72	Dec.. 4.54	7.2
St. Louis & San Francisco	708,966	699,957	Inc.. 9,009	1.3
Net earnings	360,138	248,655	Inc.. 111,483	44.8
Per cent. of exps...	49.20	64.47	Dec.. 15.27	23.7
St. Paul & Sioux City.	248,256	317,313	Dec.. 69,057	21.8
Net earnings	58,159	107,249	Dec.. 49,090	45.8
Per cent. of exps...	76.65	66.27	Inc.. 10.38	15.7
Sioux City & St. Paul.	134,330	192,925	Dec.. 58,595	30.4
Net earnings	13,031	44,572	Dec.. 31,531	70.7
Per cent. of exps...	90.31	76.87	Inc.. 13.44	17.5
Union Pacific	6,987,406	6,624,714	Inc.. 362,692	5.5
Net earnings	3,992,020	3,534,827	Inc.. 457,193	12.9
Per cent. of exps...	42.87	46.64	Dec.. 3.77	8.1

Month of June:

Erie	$1,232,163	$1,212,475	Inc.. $19,688	1.6
Net earnings	256,258	185,313	Inc.. 70,945	38.3
Per cent. of exps...	79.05	84.71	Dec.. 5.66	6.7

Month of July:

Union Pacific	$994,997	$978,781	Inc.. $16,216	1.7
Net earnings	485,982	561,667	Dec.. 75,685	13.5
Per cent. of exps....	51.16	42.61	Inc.. 8.55	20.1
Wellington, Grey & Bruce	33,136	34,435	Dec.. 1,299	3.8

Month of August:

Central Pacific	$1,385,000	$1,696,153	Dec.. $311,153	18.3
Cleveland, Mt. Vernon & Delaware	33,989	33,001	Inc.. 988	3.0
Denver & Rio Grande.	83,510	44,449	Inc.. 39,061	88.0
Indianapolis, Bloom. & Western	128,636	138,275	Dec.. 9,639	7.0
Louisville & Nashville	461,402	413,895	Inc.. 47,507	11.5
St. Louis & Southeastern	112,702	104,845	Inc.. 7,857	7.5

First week in September:

Atchison, Topeka & Santa Fe	$64,271	$50,209	Inc.. $14,062	28.0
Denver & Rio Grande.	17,542	.....	....	....
Missouri, Kansas & Texas	71,306	67,103	Inc.. 4,203	6.3
St. Louis, Iron Mt. & Southern	99,600	91,585	Inc.. 8,015	8.7

Week ending Sept. 8:

Grand Trunk	$200,202	$183,685	Inc.. $16,517	9.0

Central Pacific earnings are compared with 1875 as follows:

	1877.	1875.	Decrease.	P. c.
Month of August	$1,385,000	$1,553,014	$168,014	10.8
Eight months ending Aug. 31.	10,615,572	10,999,422	383,850	3.5

Grain Movement.

Receipts and shipments of grain of all kinds for the week ending Sept. 8 have been, in bushels:

	1877.	1876.	Increase.	P. c.
Lake ports' receipts	5,015,253	4,240,764	774,489	18.3
" " shipments	4,598,604	4,192,884	405,720	9.7
Atlantic ports' receipts	4,745,601	3,612,266	1,133,335	31.4

Of the lake ports' shipments, 21½ per cent. went by rail this year, against 43 per cent. in 1876, 36¼ in 1875, and 9 in 1874.

Of the receipts at Atlantic ports, 50.9 per cent. this year were at New York, 3.3 per cent. at Philadelphia, 12.4 at Baltimore, 12 at Montreal, 9 at Boston, 2.3 at New Orleans, and 0.1 at Portland.

Receipts of flour and wheat at San Francisco for the two months ending Aug. 31 were 211,800 quarter sacks flour and 701,000 centals of wheat. Reducing both to bushels of wheat the receipts for the two months were: 1877, 1,433,167 bushels; 1876, 4,263,333; decrease, 2,830,166 bushels, or 66.4 per cent.

Chicago receipts and shipments for the week ending Sept. 15 were:

	1877.	1876.	Increase.	P. c.
Receipts	3,049,226	2,548,637	1,500,589	97.0
Shipments	2,505,214	2,432,997	72,217	3.0

Coal Movement.

The anthracite coal tonnage reported for the week ending Sept. 8 was: 1877, 336,114; 1876, 417,571; decrease, 81,457 tons, or 19.5 per cent.

The coal tonnage of the New York State canals from the opening of navigation up to Sept. 7 was as follows:

	1877.	1876.	Inc. or Dec.	P. c.
Anthracite	581,202	463,993	Inc.. 117,209	25.3
Bituminous	164,982	181,590	Dec.. 16,608	9.1
Total	746,184	645,583	Inc.. 100,601	15.6

The tonnage cleared from the tide-water ports, New York, Albany, West Troy and Waterford, was 504,933 tons against 262,803 in 1876; from ports on line of canals, 241,251 tons, against 382,780 in 1876.

Bituminous and semi-bituminous tonnages not heretofore reported for the eight months ending Aug. 31 were:

	1877.	1876.	Inc. or Dec.	P. c.
East Broad Top	34,416	46,346	Dec.. 11,930	25.8
Bellefonte & Snow Shoe	25,641	34,660	Dec.. 9,019	26.0
Allegheny Region, Pa. R. R.	125,293	135,431	Dec.. 10,138	7.5
West Penna. R. R.	115,587	129,082	Dec.. 13,495	10.5
Southwest Penna. R. R.	25,419	38,119	Dec.. 12,700	33.3
Penn and Westmoreland gas coal	410,092	506,599	Dec.. 96,507	19.0
Pittsburgh Region, Pa. R. R.	221,962	166,722	Inc.. 55,240	33.1
Total	958,410	1,056,959	Dec.. 98,549	9.3

The miners in the Westmoreland gas coal region in Western Pennsylvania have gone to work again at the old rates, except that the miners at the Irwin Mines have received an advance of five cents per ton.

The coal passing over the Pennsylvania & New York Railroad for the nine months from Dec. 1 to Aug. 31 was: Anthracite, 601,560; bituminous, 250,607; total, 852,167 tons. The anthracite showed an increase of 39,226 tons, or 7 per cent.

The coal tonnage of the Pennsylvania Railroad for the eight months ending Aug. 31 was:

	1877.	1876.	Inc. or Dec.	P. c
Anthracite	385,856	451,359	Dec.. 65,503	15.5
Semi-bituminous	1,053,210	983,306	Inc.. 69,904	7.1
Bituminous	934,306	1,014,849	Dec.. 80,543	7.9
Coke	503,241	520,088	Dec.. 16,847	3.2
Total	2,876,613	2,969,602	Dec.. 92,989	3.1

The August tonnages this year were somewhat lighter than last year.

The Tennessee Coal & Railroad Co. reports shipments from its mines near Tracy City, Tenn., for the eight months ending Aug. 31 of 58,001 tons coal and 746,884 bushels coke.

The shipments of coal from the mines at and near Seattle, Wash. Ter., for the eight months ending Aug. 31 were: 1877, 81,254; 1876, 71,651; increase, 9,603 tons, or 13.4 per cent.

Coal shipments from Picton, Nova Scotia, for the eight months ending Sept. 1 were 114,787 tons.

Petroleum Movement.

Petroleum exports for the eight months from Jan. 1 to Sept. 1 have been, in gallons, for four years:

From—	1877.	1876.	1875.	1874.
New York	166,973,705	89,441,385	98,873,817	106,588,597
Boston	3,067,354	1,852,340	1,696,792	2,656,338
Philadelphia	27,925,257	42,294,564	37,240,824	53,620,967
Baltimore	26,479,690	26,489,104	18,219,821	3,791,645
Richmond	4,082,400	.....	.....	.....
Portland	1,392,344	.....	.....	.....
Norfolk	391,100	.....	.....	.....
Total	230,311,850	160,077,393	156,031,254	165,657,547

The increase in exports this year over last is no less than 43 per cent. But while the total exports have increased by 70,000,000 gallons, the New York exports are larger by 77,500,000 gallons, having increased 86⅔ per cent. in one year. The New York exports this year were 72½ per cent. of the total, against 56 per cent. in 1876, 63¼ in 1875, and 64¼ in 1874. The Philadelphia exports were 12¼ per cent. this year, 26⅛ in 1876, 24 in 1875, and 32¼ in 1874.

The distribution of petroleum from the producing districts for the months of June and July are reported as follows, in barrels:

To—	1877.	P. c.	1876.	P. c.
New York	1,213,947	48.8	566,213	26.8
Cleveland	631,351	25.4	462,466	21.9
Pittsburgh	341,227	13.7	391,008	18.5
Philadelphia	72,325	2.9	206,158	9.8
Boston	70,932	2.9	46,292	2.2
Baltimore	35,133	1.4	55,199	2.6
Down Ohio River	35,315	1.4	44,159	2.1
Destroyed by lightning	.....	..	196,698	9.3
Refined for Creek	.....	..	130,243	6.2
Local shipments	87,875	3.5	13,832	0.6
Total	2,488,105	100.0	2,153,708	100.0

The shipments are made first to the places where it is refined or exported. Cleveland is the great refining centre, being the headquarters of the Standard Oil Company, though that company has many refineries elsewhere. The effect of its disagreement with the Pennsylvania Railroad Company is shown especially in the falling-off of shipments to Philadelphia (decrease 65 per cent.) and Baltimore (decrease 36 per cent.).

Delaware Fruit Traffic.

The shipments of peaches over the Delaware Railroad up to Sept. 15 were 4,618 car-loads. Shipments are now rapidly decreasing; this week only a single peach train is run, and that will probably be taken off next week, when only a few scattering car-loads can be expected.

Water Rates.

There has been an advance during the week ending with Tuesday last in lake and canal rates. Lake rates closed at 3½ cents for corn and 4 for wheat per bushel from Chicago to Buffalo, and canal rates at 8 cents for wheat, 7 for corn and 4¾ for oats from Buffalo to New York. Lake-and-rail rates from Chicago to New York (propeller to Buffalo or Erie and rail thence) are quoted at 16½ cents per bushel for wheat, 15 for corn and 10 cents for oats. Ocean rates have been pretty steady, closing Tuesday at 7s. to 7s. 3d. per quarter for grain by sail from New York to Cork for orders, and 10½d. per bushel by steam to Liverpool.

OLD AND NEW ROADS.

Anderson & Augusta.

At a meeting held in Lowndesville, S. C., Sept. 8, a company was organized to build a railroad from Anderson Court House, S. C., by way of Lowndesville and Calhoun's Mills to a connection with the proposed Greenwood & Augusta road at Dorn's Mine. The distance is about 40 miles. A convention in aid of the road was appointed to be held at Anderson, Sept. 18.

Albany & Saratoga.

It is proposed to build a narrow-gauge road from Albany, N. Y., by way of Troy and Mechanicsville to Saratoga. It would come into direct competition with the existing line, both for through and local business.

Boston & Albany.

A fire, which originated in some unknown manner, broke out in the repair shops of this company at Springfield, Mass., early on the evening of Sept. 13, and, in spite of the efforts of the employes and the local fire department, destroyed the car shop, the blacksmith shop and a part of the machine shop. In the car shop were 16 freight cars, which were entirely destroyed; the machine shop contained eight engines under repair and two new ones under construction, these last, with four of the old engines, being destroyed, the other four being hauled out and saved. The firemen succeeded in saving the engine and boiler house, the south end of the machine shop and the paint shop, in which were several passenger cars and tenders. The buildings contained a number of valuable tools, which were destroyed or badly damaged, but most of the patterns stored in one of the shops were saved. The loss is estimated at from $100,000 to $150,000. The night watchman, an old and trusted employe, was burned to death, while trying to put out the fire soon after it was discovered.

The machine shops will probably be rebuilt, but it is thought possible that the car work may be removed to Allston, where the chief car shops of the road are.

Boston, Albany & Schenectady.

This is one of the numerous projects for a western connection with the Hoosac Tunnel. The line as surveyed runs from the Troy & Boston at the Vermont State line west by south to Greenbush, crosses the Hudson below the present bridges and runs from Albany to Schenectady south of the New York Central, making connections at Schenectady with the Albany & Susquehanna road and the Erie Canal. The distance is 48 miles, the estimated cost $2,300,000, and it is claimed that contractors are ready to build the road for that amount in stock and bonds.

Burlington, Cedar Rapids & Northern.

The extension of the main line is now completed to Albert Lea, Minn., 17 miles north by west from Northwood, and 252 miles from the southern terminus at Burlington, Ia. Of this line 242 miles are owned by the company, the use of 10 miles, from Shell Rock to Northwood, being leased from the Central of Iowa. Connection is made at Albert Lea with the Southern Minnesota, and the Minneapolis & St. Louis extension is expected to reach the same point in a short time, completing a line from Burlington to St. Paul and Minneapolis. Trains began to run through to Albert Lea last week.

Brotherhood of Locomotive Firemen.

The annual convention met in Indianapolis, Sept. 11, delegates from 87 lodges being present. After usual preliminary proceedings the delegates were addressed by Mayor Caven, of Indianapolis, who welcomed them to the city and expressed his confidence in the organization, as composed of reasonable and law-abiding men. Several other addresses were made, and the convention then went into secret session.

The convention continued in session until Sept. 15, all the proceedings being private. It is said that the Grievance Committee reported on a number of cases submitted to it and that its reports were mainly in favor of the companies, but none of these proceedings were made public.

Burlington, Monmouth & Illinois River.

The managers of this company are trying to secure subscriptions for their projected narrow-gauge line in Peoria, Ill., promising to make Peoria the eastern terminus, provided sufficient inducements are offered. It is estimated that the road can be built for $7,000 per mile, and it is proposed to raise $3,000 per mile by stock subscriptions and $4,000 by an issue of bonds. Subscriptions to the amount of $90,000 have been promised for the 37 miles from Monmouth, Ill., southeast to Fairview, and Peoria is asked to add $21,000.

Baltimore & Ohio.

In the suit brought by the State of Maryland to recover the tax of one-half of 1 per cent. on the gross receipts of this company, the Maryland Superior Court has decided in favor of the company. The State appeals, and will carry the case up to the Court of Appeals.

Bangor & Piscataquis.

Although this road is now under a separate management, it depends upon the European and North American for its entrance into Bangor, and arrangements were made to change its gauge at the same time. This was accordingly done, the change being made Sept. 13.

Chicago, Clinton & Western.

It is reported from Davenport, Ia., that an agreement has been concluded providing for the completion of this road from Clinton, Ia., to the crossing of the Maquoketa Branch of the Davenport & Northwestern road, and the operation of this section in connection with the Davenport road as a line between Clinton and Davenport. The track on the Chicago, Clinton & Western was laid two years ago for 15 miles west by south from Clinton, but it is not now operated, and it will be necessary to build about nine miles of road to make the connection. The Chicago, Dubuque & Minnesota, it is said, joins in the agreement and will use the line to Davenport.

Cleveland, Columbus, Cincinnati & Indianapolis.

The work of changing the gauge from 4 ft. 9½ in. to 4 ft. 8½ in. has been begun and will be completed as fast as possible. The trackmen are now at work on the frogs and switches and the yard tracks at the division stations. Most of the equipment is ready for the change.

Chicago, Dubuque & Minnesota.

Notices have been filed of the incorporation of two new companies, to be known as the Dubuque & Minnesota and the Clinton & Dubuque, for the purpose of purchasing respectively the Chicago, Dubuque & Minnesota and the Chicago, Clinton & Dubuque roads. The new corporations are formed in execution of the agreements of reorganization heretofore executed, and the purchase of the roads will date from Jan. 1, 1877. The incorporators of both companies are the same, and it is understood that, as soon as the necessary formalities can be completed, the two companies will be consolidated under the name of the Chicago, Clinton, Dubuque & Minnesota Railroad Company. The stock of the consolidated company will be fixed at $5,925,000. The incorporators are James F. Joy, Detroit; Wm. J. Rotch, New Bedford, Mass.; Sidney Bartlett, J. W. Brooks, John A. Burnham, J. N. Denison, A. Hardy, H. H. Hunnewell, Nathaniel Thayer, Boston.

Chicago & Evanston.

It is reported that work is soon to be begun on this suburban line, which is to run from Chicago north to Evanston, about 12 miles. The company is controlled by parties interested in the North Chicago street road.

Chicago & Lake Huron.

Mr. Justice Swain, of the United States Supreme Court, sitting in chambers, has granted an order vacating the order for the sale of this road granted by the United States Circuit Court. The order, which was granted on application of some of the bondholders of the old Port Huron & Lake Michigan Company, directs the trustees to file an amended bill of foreclosure, in order that the rights claimed by the bondholders may be fully presented to the Court before any further decree is granted. The new suit will include as defendants the Chicago & Northeastern Company, upon whose property the Port Huron & Lake Michigan bondholders claim a lien, and certain parties to whom was conveyed a land grant of some 30,000 acres belonging to the same company.

Canada Southern.

The New York *Tribune* of Sept. 15 says: "Information was obtained yesterday from a member of the Joint Committee representing the New York Central and the Canada Southern railroads, that the efforts of the committee to agree upon a plan of reorganization of the Canada Southern Railway had entirely failed. The committee adjourned on Thursday without date, leaving the matter in the condition in which it was found. The cause of the failure, it was stated, grew out of the inability of the committee to agree upon the amount of bonds to be issued, the rate of interest they should bear, and the basis of exchange for the old bonds. * * *

"The committee was appointed to devise a plan of reorgan-

ization, by which the different mortgages now in existence should be exchanged for a single mortgage, covering the main line and branches. The failure of the committee to agree leaves the condition of the existing bonds unchanged."

Dividends.

Dividends have been declared as follows:

Union Pacific, 2 per cent., quarterly, payable Oct. 1. Transfer books will be closed from Sept. 20 to Oct. 2.

Lehigh Valley, 1 per cent., quarterly, payable Oct. 15.

Danville, Olney & Ohio River.

A correspondent writes: "The contract for building the portion of this road lying between Danville and Olney, Ill., was let on the 10th inst. to Col. S. N. Yeomans, L. B. Jones and S. F. Rock, of Washington Court House, Ohio. This portion of the road is 100 miles in length. The road is to be constructed of 3 ft. gauge, and is to be completed on or before Oct. 1, 1878."

Detroit & Milwaukee.

The Chicago *Engineering News* describes as follows some improvements recently made on this road. The slabs and edgings spoken of are procured from saw-mills on the line of the road, and cost nothing except the expense of hauling them to the place where they are used:

"At six miles east of Grand Rapids and on the summit of a grade, is the Saddle Bag Swamp, a deep sink hole of 2,600 feet in length, 50 feet deep in the centre, and 60 feet to clay. The contents of this hole are water and muck, and the thin crust which covered the mass was incapable of carrying but a very light weight. A former engineer had attempted to build a roadway over this hole, but after he had dumped a good deal of material into it with little prospect of succeeding, the attempt was abandoned and for 20 years the roadway has been maintained on seven and eight degree curves around the northern top of the slough. This season Mr. Masson attacked the problem with his slabs and sand, and in three months with one train, 50 men on the train and 25 on the dumps, raising track, etc., and at a cost of $10,000 in all, a solid roadway was carried over the hitherto unpassable ditch and all trains are now running across it. Slabs and edgings 16 feet long were laid down and firmly bound together by being crossed, until a raft 10 feet thick was built upon which the train of sand cars could be run. Sand was hauled on until the sinking of the road-bed ceased and the track was brought to grade. The greatest difficulty to contend with was the tipping of the rafts which were a source of great annoyance, and had to be carefully guarded against. The roadway is now suspended over the hole by this raft, and no fears are entertained as to its permanence, since there is no outlet for the water and no chance for a washout. If the water could be drawn off by means of a drain, which, however, would need to be nearly 50 feet under ground, the road-bed would be made still more permanent. In the saving of wear and tear of rolling stock and rails in the sharp curves, the cost of the improvement will soon be made up.

"There are no stone quarries on the line of the railroad and to replace wooden culverts with stone ones was expensive. But among the old iron rails taken up were many that would bring only the price of old iron; these the engineer used as coverings to his culverts. On 4 ft. culverts with stone walls rails were laid, web down, and just far enough apart to allow tracks to be laid so as to fill the space; a most excellent and permanent covering was thus formed and with materials for which no cash had to be expended. Over 4 feet openings every fourth girder was made by setting one rail upon another, web to web; but the method is specially adapted to 4 feet openings."

Erie.

In the New York Supreme Court Sept. 12 argument was heard on an application of L. C. Woodruff, trustee, for an order to compel Receiver Jewett to pay the interest upon $120,000 bonds of the Erie & Genesee Valley road, under a lease made several years ago. The Court refused the application, but granted Mr. Woodruff leave to bring a suit against the Receiver.

European & North American.

The gauge of the Bangor & Bucksport Branch was changed Sept. 12. The work on the main line was begun Sept. 14 and on that day the trackmen, who had been previously distributed along the line, completed the 78 miles from Vanceboro to Enfield and were gathered up by the standard-gauge train from Vanceboro, which brought them to Enfield, whence they were distributed over the 36 miles from Enfield to Bangor. This section was completed on the following day, when the standard-gauge trains ran through. All the through passenger trains ran as usual, but the night train on the 14th had to transfer its passengers at Enfield.

The Eastern Division, from Vanceboro to St. John, was changed at the same time, the 66 miles from Vanceboro to Welsford being completed Sept. 14, and the remaining 26 miles on the following day. On the Eastern Division only one rail was moved, but on the Western Division both rails were shifted in doing the work.

The Fredericton Railway, a branch of the Eastern Division, has also been changed to the standard gauge.

Foreclosure Sales.

The sale of the *Chicago & Lake Huron* road, advertised for Sept. 20, is indefinitely postponed in consequence of an appeal from the foreclosure taken by the bondholders of the old Port Huron & Lake Michigan Company.

The section of the *Memphis, Carthage & Northwestern* road in Kansas will be sold at Topeka, Kan., Nov. 26, under a decree of the United States Circuit Court. Only about three miles of completed road, from the State line to Oswego, are in Kansas. The road in Missouri was sold some two years ago, and reorganized as the Missouri & Western.

Foxburg, St. Petersburg & Clarion.

The track on this narrow-gauge road is now laid from Foxburg, Pa., on the Allegheny Valley road, to St. Petersburg, four miles, and trains are running regularly. About 200 men are employed on the grading between St. Petersburg and Clarion, about 14 miles.

Gilbert Elevated.

The New York Court of Appeals has just decided in one of the suits against this company that the Rapid Transit law of 1875 is not unconstitutional; that the powers given by that law to the Commissioners were not greater than it was in the power of the Legislature to delegate; that it has not been made clear that the clause of the Constitution relating to exclusive franchises has been violated, and that the conditions imposed by the Rapid Transit Commission do not change the character of the charter of the company or work its forfeiture. The Court, however, holds that the questions as to whether the road to be built is to be regarded as a legitimate use of a public street, and as to damages to holders of adjoining property, cannot be decided on the present appeal.

Greenwood & Augusta.

This company has secured cash subscriptions amounting to $375,000, and grading is to be begun at once near Greenwood, S. C., by a number of convicts, whose labor has been secured from the State. Greenwood is on the Greenville & Columbia road, and the proposed line runs a little east of south through Abbeville and Edgefield counties to Augusta, Ga., about 55 miles.

Illinois Central.

The Land Department reports for August sales of 492 67 acres of land for $3,350.69; cash collections on land contracts were $11,245.78.

The Traffic Department reports the August earnings on the 707 miles of road in Illinois as follows: 1877, $508,976.17; 1876, $489,674.22; increase, $19,301.95, or 3.9 per cent. These earnings were $720 per mile in 1877, and $693 in 1876.

Lehigh Valley.

The Philadelphia *Ledger* publishes the following statement of the net earnings of this road for the six months ending with August:

	Coal.	Freight.	Passengers, etc.	Total.
March	$114,207 98	$35,544 08	$10,204 01	$159,956 07
April	218,713 42	62,931 77	16,635 04	298,280 23
May	273,405 06	57,671 04	17,124 04	348,200 34
June	211,308 79	48,273 13	17,294 12	276,876 04
July	175,070 97	33,508 87	12,993 33	221,573 17
August (partly estimated)				240,000 00
Total				$1,544,885 85

The interest and other fixed charges for the six months were $800,000, and the two dividends paid amounted to $550,000, with $27,500 taxes, making $1,377,500 in all, and leaving a surplus of $167,385.85 for the half year.

Minneapolis & St. Louis.

This road is now completed to Waseca, Minn., eight miles beyond Waterville, the last point noted, and 72 miles southward from Minneapolis. The regular trains began to run to Waseca Sept. 17.

New Jersey & New York.

Notice is given that the Special Master in Chancery will sell on Sept. 21 the whole or part of $167,000 consolidated mortgage bonds of this company held by the Rogers Locomotive & Machine Works, of Paterson, N. J., as collateral security.

New York Elevated.

The New York Court of Appeals has just decided, on an appeal from an order granted on petition of this company, that the company has the same right to acquire real estate for the use of its road as is conferred by the general railroad law of the State, and that ample provision is made for any rights which abutting property owners may have in the streets. As in the parallel case of the Gilbert Elevated Company, the Court holds that the Rapid Transit law of 1875 is constitutional, and that the action of the Commissioners under that law confers upon the company the same rights as to its proposed new line as it would have if that were a part of the original line.

Pennsylvania.

The company has presented to the committee of merchants in Philadelphia another formal proposition regarding the prosecution of claims for losses during the riots at Pittsburgh, as follows: "That neither the claimants nor the company shall be considered as waiving any legal rights; that the claimants shall commence the prosecution of their claims against the county of Allegheny before the first day of December, 1877, placing them in the hands of counsel to be employed and paid by the company, in accordance with the circular of Aug. 17, 1877, signed by S. B. Kingston, General Freight Agent, and if by the first day of October, 1878, such claims have not been realized from or adjusted with the county of Allegheny by the claimants, then the claimants to employ counsel for themselves, and at their own expense, with whom the counsel of the company will state as many cases as may be necessary to cover each class of claims, and determine the liability of the company therefor. Such cases shall be prosecuted without unnecessary delay, and for all claims in any class for which the company shall be adjudged to be liable, payment shall be made by the company within two years from the date of the losses, of the amounts ascertained to be due, with legal interest thereon, and such claims shall thereupon be assigned to the company; and that the claimants shall designate a committee of three persons to act in conjunction with three members of the board of directors of the company in supervising the prosecution of all such claims as may be presented under this arrangement."

It is announced that at a meeting of the board in Philadelphia, Sept. 17, the negotiations for the purchase, by the Pennsylvania Railroad Company, of the property of the Empire Transportation Company, which have been in progress for some time, were virtually brought to a close, although the details of the transfer have not yet been settled. This sale does not include the Erie & Western Transportation Company, the capital stock of which is owned by the Empire Transportation Company.

The Empire Transportation Company has a capital of $4,000,000, and operates what are known as the Empire and the Green lines running over the Pennsylvania and the Philadelphia & Erie roads between New York and Philadelphia and Erie and other western points. It has been very largely engaged in transporting petroleum. Besides about 4,500 cars used on its various lines, it owns about 520 miles of oil-pipe lines in Western Pennsylvania, and extensive docks with warehouses and grain elevators at Erie. Besides its rail connections west from Erie, it owns all the stock of the Erie & Western Transportation Company, which has a fleet of 17 vessels employed on the lakes between Erie and other lake ports, and is a large carrier of grain.

In its original contracts with the Empire Transportation Company, the Pennsylvania Railroad Company reserved the right to buy out the property of that company at an appraised valuation. The present sale is said to have been first proposed by the Empire Company. The transfer may have considerable effect on the oil business, for it is reported that the Pennsylvania is negotiating with the Standard Oil Company for a settlement of the differences between them, and that this settlement will include a transfer of the Empire pipe lines to the Standard Oil Company.

Pittsburgh, New Castle & Lake Erie.

The lowest bid received for the construction of the first 30 miles of this road was from Mr. Valentine M. Lary, who offers to build the road complete for $225,990. The contract has not yet been signed, but will probably be given to Mr. Lary, as soon as the arrangements can be completed. Mr. Lary built a part of the New Jersey & New York road, and is now Receiver of that road.

Philadelphia & Reading.

Two of the strikers who are charged with burning the bridge over the Schuylkill at Reading during the recent strike have been arrested and held for trial. One was found in Philadelphia, the other in New Haven, Conn., where he had found a place as firemen on the Boston & New York Air Line under an assumed name. Two more of the strikers have since been arrested.

Philadelphia, Wilmington & Baltimore.

The Wilmington (Del.) *Gazette* of Sept. 13 says: "This company has been of late frequently the victims of ravages of tramps, who seem to haunt the line of the road, and to whose effrontery and disregard of law there seems to be no limit. A little over a week ago a dastardly attempt was made to wreck a passenger train at Gunpowder River bridge, which only failed in being successful by the lucky choice on the part of the perpetrators of locality unfavorable to the designs. As it was, the engine collided with a loaded car shoved from a side track. Wednesday night of last week three masked men, presumably tramps, entered the office of the telegraph operator at Bayview and forced him to hand over all the money he had about him. On Friday night some tramps boarded the milk train bound to Baltimore and took by force $32 from a drover on board; and now these acts of violence are supplemented by another scarcely less daring and certainly no less alarming, as evincing the character of the men with whom railroad companies and others have to deal. The freight train which leaves Baltimore every night shortly after 8 o'clock left President street depot at the usual hour on Sunday night and proceeded northward. About daylight next morning, or a little earlier, a brakeman who was on the rear of the train noticed at several points along the road and near the track several boxes and packages which appeared to be rolling down the bank from the track. He rubbed his eyes and looked again and presently another package came tumbling down and the mystery was cleared away—somebody was throwing goods off the train. He immediately ran over the top of the cars, examining as well as he could the side doors, until he came to the fourth or fifth car from the engine, the door of which he found open. He leaned over the side and looked in, putting the lantern down as he did so to give light on the situation. As he did this two men rushed from the car and jumped from it to the ground, and though the train was at a good speed they did not fall but remained on their feet and made their escape. The train arriving at Wilmington, the car was examined and it was found that several boxes and barrels were missing, and that other packages had been broken open. The amount stolen can only be estimated, and as most of it was subsequently recovered by a switch engine that went down the road to pick it up the loss is inconsiderable. It is now in order to take some strenuous measures to punish swiftly and severely such depredators."

Suffolk & Albemarle.

About $80,000 in subscriptions have been secured for this road, and its projectors hope to begin work soon. The road is to run from Edenton, N. C., on Albemarle Sound, nearly due north to the Virginia line and thence north by east to Suffolk, Va., where connection is to be made with the Seaboard & Roanoke road. The distance is about 48 miles and the gauge is to be 3 ft. 6 in. From Suffolk south by west to Somerton, about 10 miles, there is already in operation a road built to carry lumber to the mills at Suffolk. This was originally laid with 20-lbs. rails, which have proved too light, and it is now being relaid with 30-lbs. rails and extended three miles to the Virginia line. Along the shore at and near Edenton there are several extensive and valuable fisheries, and the country back of Edenton produces much corn, besides which there is a considerable and growing business in fruit and vegetables, which there mature eight or ten days earlier than about Norfolk. The traffic now goes through the Albemarle & Chesapeake Canal to Norfolk or by steamboat up the Chowan and Blackwater to Franklin on the Seaboard & Roanoke road, but these means of transportation are both too slow for the fish and garden truck business. It is believed that the railroad will give a considerable development to both those interests, besides securing the grain trade from the country on the line which is some distance back from the Chowan River, where also most of the landings are difficult of access both for boats and teams.

St. Louis & Southeastern.

The Auditor's report of gross earnings for August is as follows:

	St. Louis Div.	Kentucky Div.	Tennessee Div.	Entire line.
Passengers	$19,001 54	$8,908 78	$4,806 63	$32,716 95
Freight	39,554 21	24,229 62	11,968 79	75,752 62
Mail, express, etc.	2,669 97	1,033 45	528 89	4,232 31
Total	$61,225 72	$34,171 85	$17,304 31	$112,701 88
Earnings per mile.	291 55	348 69	363 18	317 47

As compared with August, 1876, the St. Louis Division shows an increase of $5,022.39; the Kentucky Division a decrease of $873.14; the Tennessee Division an increase of $3,707.54, and the entire line an increase of $7,856.79, or 7.5 per cent.

Seattle & Walla Walla.

Tracklaying has been begun on the extension of this road from Renton, Wash. Ter., to the Newcastle coal mines. The whole six miles of the extension is over very rough country, requiring many cuts, fills, bridges and trestles; one trestle is 750 feet long and 116 feet high. There is a grade of 100 feet to the mile for nearly the whole distance.

Toledo & South Haven.

The section of this narrow-gauge road from Paw Paw, Mich., westward to Lawrence, eight miles, is completed, and regular trains will begin running over the line next week. It is not expected that any extension of the road will be made this year, but the company hopes to begin work on the line from Paw Paw to Toledo, O., next spring.

Union Pacific.

Work has been in progress night and day on the temporary bridge to replace the two spans of the bridge over the Missouri at Omaha which were lately destroyed. At latest accounts this temporary structure was nearly done, and it was expected that trains could cross safely on the afternoon of Sept. 19, or early the next day.

An eastern bound express train on this road was stopped at Big Springs, Neb., on the afternoon of Sept. 18 by the usual signal and on stopping was boarded by thirteen masked and armed men, who at once placed a guard on each car, drew out the fire from the engine, and proceeded to break open the safes in the express car, from which they took about $75,000. They also robbed a number of the passengers, and then left the place on horseback, going north. The train remained at Big Springs until a freight train came up, the engine of which was sent to Ogalalla for assistance. The Union Pacific Company has offered $5,000 and the Express Company $10,000 reward for the capture of the robbers, but they have secured a long start from any pursuit.

Worthington & Sioux Falls.

This company last week let to Mitchell Vincent, of Sioux City, Iowa, a contract for grading this road from the present terminus at Luverne, Minn., west by south to Valley Springs, on the Dakota line, about 14 miles. This section will be completed this fall, and there will then remain about 12 miles to be built to reach Sioux Falls in Dakota. The line is now in operation from Worthington, Minn., westward to Luverne, 34 miles; it is owned by parties interested in the Sioux City & St. Paul road, as a branch of that road and to open its land grant to settlement.

Walkill Valley.

The gauge of this road, from Montgomery, N. Y., to Kingston, 33 miles, was to be changed this week from 6 ft. to 4 ft. 8½ in. This will break the connection with the Erie and compel the transfer of all business at Montgomery, the terminus of the Montgomery Branch of that road, 10 miles from the main line at Goshen.

Wisconsin Central.

In the case of Seymour and others against this company, the United States Circuit Court has decided that the company's books must be produced in court and that its officers must answer fully as to the relations between the company and the Phillips & Colby Construction Company.